TELEPHONE ENGINEER

MANAGEMENT • ENGINEERING • MAINTENANCE

MAY
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"GENTLEMEN, THIS HANDSET MEETS OUR REQUIREMENTS"

That is exactly the conclusion arrived at by most operating companies after an inspection of the Stromberg-Carlson No. 1191 Handset. It is a completely self-contained instrument with ringer induction coil and condenser in the base of the instrument. It does away completely with the bell box resulting in economy in purchase, installation and maintenance for the operating company. The subscriber, too, appreciates this instrument not only for its beauty, lightness and clarity of tone, but also because it is no longer necessary to have his walls defaced by a bell box.

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FEATURES OF THE STROMBERG-CARLSON No. 1191 HANDSET:

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2 The Induction Coil is of entirely new design, resembling the highly efficient radio audio transformer; it is of the three-winding type required in the anti-side tone circuit and is designed to give the best transmitting and receiving efficiency.

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- **Employed 335,000 persons.**
- **Paid $427,000,000 in salaries and wages.**
- **Paid $104,000,000 in taxes.**
- **Paid $193,000,000 in dividends to 800,000 stockholders.**

... NOT ONLY THE MOST *Beautiful* BUT MOST *Efficient* ..."

TELEPHONE ENGINEER
MANAGEMENT - ENGINEERING - MAINTENANCE

MAY, 1936

"Tapping In" On Washington

By ROLAND C. DAVIES
Editor
Telecommunications Reports

● A $400,000 appropriation in addition to the current $750,000 fund is believed to be assured to the Federal Communications Commission for the continuation of the telephone investigation through the inclusion of the added amount in the Deficiency Appropriation Bill, now before Congress. This will mean that hearings in the investigation will be held next fall and in the early winter up to February 1, 1937.

The House approved the $400,000 appropriation without even mentioning the item during the debate of the Deficiency Bill. The Senate appropriations committee has already started executive session hearings on the Deficiency Bill and is expected to push it to a vote in the Senate before the controverted tax bill is taken up. Definite indications are that the FCC fund will be sanctioned by the Senate.

In the meantime the investigation stood at a standstill as far as the holding of hearings throughout May is concerned. On May 12, when the hearings were scheduled to be resumed, Chairman Paul A. Walker of the FCC Telephone Division issued an announcement continuing hearings until a date to be fixed later. It is expected, however, that the sessions, according to the Telephone Division statement, will be resumed on June 2, with presentation of material gathered by the engineering investigation staff and additional reports prepared by the accounting department. Commissioner Walker disclosed that a progress report of the investigation's work now underway and expected for completion during the current investigation will be sent to Congress. The major reason for the postponement of the hearings, Commissioner Walker said, was that proper presentation of the reports by the investigating staff required careful checking "to avoid possible errors of statement or facts".

● In appearing before the House appropriations committee to urge the $400,000 fund, Commissioner Walker disclosed that he had desired $500,000 or $560,000 at least and had been hopeful of another $750,000 but such latter amounts had not been agreed to in conferences with the budget bureau and House group. As a result, the $400,000 fund would mean the reducing of the FCC investigating staff considerably by June 1 to carry on the inquiry until February 1, 1937. The Telephone Division chairman was questioned at length by the members of the House appropriations committee on the accomplishments of the investigation and Chairman Buchanan of the House committee, regarded as one of the House leaders, warned the FCC that it could not expect to secure more than the $400,000 fund unless Congress deemed it desirable on the basis of the investigation results.

The House appropriations committee chairman rather sharply criticized the context of the Congressional resolution of March, 1935, authorizing the FCC investigation by declaring that it was "entirely too broad" and "ought never to have been written so broadly". Rep. Buchanan characterized the investigation resolution as so broad as to possibly include the probing of "the character of the girl who talks over the wire". The House chairman told Commissioner Walker that the FCC investigation should be confined to certain lines of the inquiry which could be completed by next February. Then after reporting on that work by the Commission, Congress could decide whether more money should be appropriated for the investigation.

The members of the House committee closely questioned Commissioner Walker during his pleadings for the additional appropriation on how the $750,000 fund had been expended, what had been disclosed that would be helpful for rate studies and whether or not actual rate reduction moves and valuation proceedings would be launched during the investigation. Commissioner Walker told the House committee that the evidence of the investigation hearings had shown the long distance rates of the A. T. & T. were "very much too high", exceeding toll charges in Europe, although he

considered the American service was superior to that abroad; that the license contract charges of approximately $14,000,000 from the associated Bell companies each year to the A. T. & T. should be eliminated because the services were those of a holding company and that the charges to the subscriber for the handset telephones should be wiped out.

● When he was questioned as to whether cross-examination had been permitted to the A. T. & T. at the hearings, Commissioner Walker declared that no cross-examination had been allowed because of the paucity of the FCC funds and the shortness of time. The commissioner, however, asserted that A. T. & T. witnesses had been permitted to make any statements they cared to make during their examination by Special Investigation Counsel Samuel Becker. The FCC Telephone Division Chairman at several points told the House committee that if Federal regulation of the telephone industry was desired sufficient funds for its accomplishment must be appropriated by Congress.

• • •

Rate Structure . . .

The investigation hearings during the last two weeks of April delved into subjects of bearing upon telephone rate regulation and operating expenses and revenues — the license contracts and the preceding rental of instruments agreements of the A. T. & T. with the Bell operating companies; the 1927 A. T. & T.'s sale of instruments to the associated Bell companies; the charges for the handset telephones; the Bell system pension payments and long distance revenue and profits.

Of the subjects covered during these sessions which were held April 20-23 and 28-29, the most vital question was the study of long distance operations and revenues with the alleged excessive profits between 1913 and 1935 which Commissioner Walker later described as indicating the need for a FCC rate investigation at the earliest opportunity. Long distance rates are the primary object of federal telephone regulation and FCC Accountant Julius A. Krug, former accounting official of the Wisconsin Public Service Commission, alleged in the study of these charges that between 1913-35 earnings from this service averaged the A. T. & T. 10.92 per cent annually or $180,000,000 above 6 per cent or $143,000,000 above 7 per cent, while during the same period the associated Bell companies averaged for those years a 6.72 per cent yield. C. P. Cooper, A. T. & T. vice-president, declared that Bell System investors had never in any year earned as high as 9 per cent and in 1935 the net earnings from the telephone service were 5.3 per cent.

CONVENTION SCHEDULE

New York State Telephone Association, Syracuse, May 20 and 21.

Tennessee Independent Telephone Association, Hermitage Hotel, Nashville, May 22 and 23.

North Dakota Telephone Association, Powers Hotel, Fargo, May 26 and 27.

Missouri Telephone Association, Kansas City, Hotel Muehlebach, May 27 and 28.

Pennsylvania State Telephone and Traffic Association, Penn-Harris Hotel, Harrisburg, June 11, 12 and 13.

Washington Independent Telephone Association, Ellensburg, June 12 and 13.

The Illinois Telephone Association, Pere Marquette Hotel, Peoria, September 17 and 18.

● Highlights of Mr. Krug's testimony and two reports on A. T. & T. long distance revenues, plant and operations (the latter reports being sent to the state regulatory commissions by the FCC) were as follows:

That the Long Lines telephone plant increased about 260 per cent from 1926 to 1932 with a total plant value at book cost of $433,000,000 in 1935, while in 1930 the plant construction exceeded $100,000,000 or one-fourth of the total present plant while from 1928-30 one-half of the present plant was built.

That Long Lines depreciation reserve at the end of 1935 exceeded $94,400,000 or 22 per cent of the reported book cost of depreciable plant service and annual provisions for depreciation during the five depression years of 1931-35 totaled $91,000,000 or 95 per cent of the total reserve. Fifty-five per cent of the Long Lines operating expense consists of depreciation and maintenance of telephone plant with depreciation expense accounting for 30 per cent.

Hurd Asks Cross-Examination

The most sensational development of the recent series of hearings came on April 23 with the demand of G. L. Hurd, American Telephone and Telegraph Co. counsel, that he should be permitted to cross-examine the FCC Investigation Chief Accountant John H. Bickley because of the "inaccurate and misleading information" being presented to the Commission and that the A. T. & T. be allowed to offer rebuttal evidence during the course of the hearings. Mr. Hurd charged that the investigation hearings had been an ex-parte proceeding which he believed was contrary to the mandate of Congress in authorizing the inquiry and to the desires of the Commission to obtain correct information about the telephone industry.

● Mr. Hurd had not been allowed to make this request for cross-examination at the end of the morning session on April 23 and after this refusal gave his statement to newspapermen. But at the resumption of the afternoon session he was permitted to offer his request to the Commission by Telephone Division Chairman Walker. Mr. Hurd declared that "we are deeply concerned that the information gathered by the division and the Commission in the course of this investigation shall be correct and we have no doubt that the Commission shares that view." He termed the alleged studies offered by Chief Accountant Bickley as "grossly inaccurate and misleading and unfair". In asking for cross-examination of Bickley the A. T. & T. counsel declared that "any other course would result in unfairness to the American company and the associated companies and would be subversive of the real purpose of the investigation as stated in the Congressional resolution."

The probe of the FCC investigation into the license contracts and 1927 sale of instruments by the A. T. & T. to the associated companies was carried out by Special Counsel Becker along a two-sided front. First, the aggressive FCC counsel catechized a quintet of A. T. & T. officials, including President Walter S. Gifford; John H. Ray, leading legal officer; Comptroller C. A. Heiss; Assistant Comptroller Allen B. Crunden and Auditor J. W. Green, along a line of reasoning that the license contract services should be considered a part of the A. T. & T. holding company activities and should be furnished without cost to the associated companies. Second through testimony of Chief Accountant Bickley he sought to show that the A. T. & T. and its predecessor companies, the American Bell and National Bell, had made huge profits from the rental of instruments to the associated companies and under the instrument rental agreements it was considered the research and engineering services should be rendered without cost and that the 1927 sale of instruments by the A. T. & T. to the associated companies had not only resulted in a $14,000,000 profit to the A. T. & T. but also, according to implications in Bickley's report, had resulted in the "unloading" of the desk stand instruments upon the operating companies

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Telephone Transmission
Theory and Practice

By ROBERT A. CLARK, JR.

CHAPTER IV

The basic problems of telephone transmission are presented in this chapter together with methods for measuring the characteristics of telephone lines and apparatus

● In the first three chapters we reviewed briefly the fundamental terms and definitions used in electrical theory. Let us next apply these to the telephone problems which we encounter in trying to make the long lines talk as they should. I would first like to make a few comparisons between the telephone and the electric light and power systems and point out the differences between them.

In a power system we have a source of supply (the generating station) generally feeding a number of lines with customers bridged on at various points both near to and relatively far away from the source. Each customer must be furnished with electricity at substantially the same voltage (generally 115 volts). The power engineer must design the electrical distribution system so that the voltage remains practically the same at all points regardless of the amount of load being consumed at different customer locations. This means that the voltage drop in the generator and along the line must be very small, otherwise the above conditions could not be obtained.

Expressing this requirement in another way we say that the internal impedance of the supply source must be small (generally less than 10 per cent) compared to the impedance of the load.

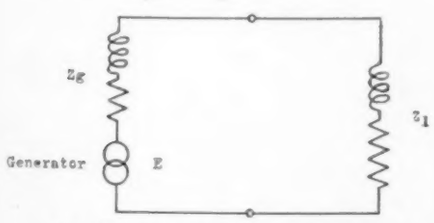

Fig. 23—Illustration of generator and load impedance.

Referring to Fig. 23 which illustrates this point, **E** represents the voltage of the supply source under no-load condition. **Zg** represents the impedance of the generator (including the line if any); **Zl** is the impedance of the load. You will note that both impedances are shown as composed of resistance and inductance, generally this is the case on power lines. Speaking in telephone language we say that **Zg** is the **internal impedance** of the source. This is a very important term in telephone calculations and should be kept in mind as we will refer to it frequently in subsequent discussion.

● The problem of telephone transmission differs from power in that the impedance of the generator (the telephone transmitter) in most cases is comparatively high. We are concerned not with maintaining constant voltage along the line but with obtaining as much power as possible from the generator and delivering it to the load (receiver) with a minimum loss. Whereas in power generation the voltage at the load must be at least about 90 per cent of the generator voltage, (disregarding transformers) the telephone engineer often considers his job well done when he obtains 10 per cent of the generator voltage across the load.

Let us illustrate these principles by means of an example. Suppose we have a six-volt storage battery connected to a number of automobile head lights as shown in Fig. 24. An equivalent resistance **Zg** is shown in series with the battery; this represents the internal resistance in the battery itself.

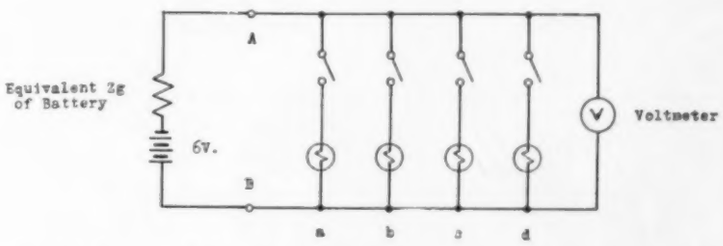

Fig. 24—Battery with lamps in multiple illustrating a power distribution circuit.

Let us assume that each lamp draws five amps. With all switches open the voltmeter will indicate six volts. As we close switches, a, b, c and d, we will observe a very slight drop in voltage as read by the voltmeter each time a switch is closed. Upon closing the last switch, all four lamps burning, we might find that the voltage had dropped to 5.9 volts. As each lamp consumes five amperes the total current drawn from the battery would be 20 amperes. By applying formula (1)

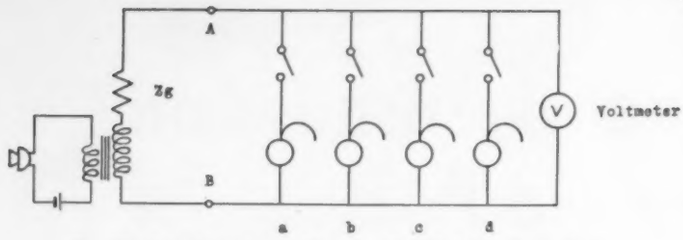

Fig. 25—Telephone transmitter circuit with bridged receivers.

Chapter I, we can find the value of **Zg** which in this case is resistance only, as a battery does not have internal reactance. Knowing that the voltage across the load is 0.1 volts less with the 20-ampere load than at no load we deduce that there must be a 0.1 volt drop in the battery when 20 amperes of current flows. Therefore the internal resistance (formula 1) must be 0.005 ohm. This is very small compared to the resistance of the four lamps in parallel which (formulas 1 and 6) is 0.300 ohms.

● Now let us consider the circuit shown in Fig. 25. Here we have a typical local battery telephone set at the left of terminals **AB** and four telephone receivers bridged across the circuit together with an a-c voltmeter having a very high resistance (say 20,000 ohms or more). We have not yet discussed the theory of a transformer such as used with a transmitter; however for the purpose of this discussion we can assume that the combination of transmitter, battery and induction coil is equivalent to the generator shown in Fig. 23. We then have a source of a-c voltage in series with an impedance **Zg** which represents the internal impedance of the transmitter and its associated battery induction coil or transformer. In this case the internal impedance has a reac-tive component which must be considered in making precise measurements. Practically, however, the reactance is small compared to the resistance and we may neglect it without incurring any appreciable error. This is also true in the case of the telephone receivers and other telephone apparatus.

We will assume that we have measured the a-c impedance of the telephone receivers and have found they each are 600 ohms resistance; the reactive component (**X** of formula 17) may be considered 0. I might digress here and explain that **there is no relation whatsoever between the d-c resistance of a piece of telephone apparatus or line and its a-c impedance.** The a-c impedance must be determined by means of an a-c wheatstone bridge or equivalent method; these measurements will be discussed in this and subsequent chapters.

Telephone receivers vary considerable in a-c resistance from as low as about 200 ohms, to as high as about 20,000 ohms. Receivers commonly used in the telephone plant range from the lower value of 200 ohms to around 5,000 ohms, mostly near the lower figure. However for our example we will assume that we are using receivers having an a-c resistance of 600 ohms and negligble reactance.

● With the switches to all receivers open when I whistle into the transmitter we note a reading of say six volts on the meter (a good transmitter will produce this deflection). Now when I close the switch to one receiver and whistle into the transmitter we note that the voltage drops to 4.0 volts. When the second receiver is switched across the circuit in parallel with the first the voltage drops to three volts. Switching the third receiver across the circuit brings the voltage down to 2.4 volts and with the fourth receiver across, the voltage drops to 2.0 volts.

TABLE 6

Number of Receivers Across the Circuit	Voltage Across the Line, Volts	Resistance of Receivers in Multiple, Ohms	Power Delivered to all receivers Milliwatts	Power Delivered to Each Receiver Milliwatts
(1)	(2)	(3)	(4)	(5)
0	6.0	—	—	—
1	4.0	600	26.6	26.6
2	3.0	300	30.0	15.0
3	2.4	200	28.8	9.6
4	2.0	150	26.6	6.7

With this data before us we can derive some interesting conclusions. From the first measurement we can determine the value of **Zg** by means of formulas (1) and (6) as before; we find this to be 300 ohms. Incidentally you will find that properly designed transmitters and induction coils will have an internal impedance in this neighborhood. Now if we compute the power delivered to the receivers, and their combined resistance for the four conditions we will obtain the values shown in Table 6.

Columns (1) and (2) are self explanatory. Column (3) is the resistance of the receivers in parallel and may be computed by means of formulas (7) and (8) (Chapter 1). Column (4) is computed from Columns (2) and (3) by use of formula (5). Column (5) is Column (4) divided by Column (1).

● You will note that maxium power is obtained from the source (Column 4) when two receivers are bridged on

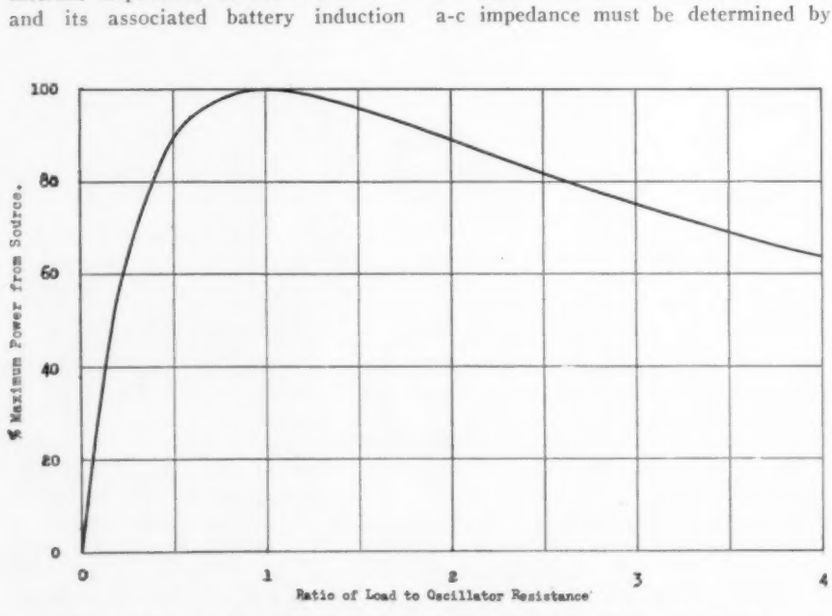

Fig. 26—Per cent of maximum possible power delivered to a load for ratio of load resistance to generator resistance.

the circuit. Under this condition the resistance of the load (the two receivers) is the same as the internal resistance of the source. This leads us to a fundamental corollary which forms the foundation of telephone transmission theory. This is: **Maximum power is obtained in the load when the resistance of the load is equal to the resistance of the source.** (Corollary 1)

Under this condition one-half the total energy developed by the source (generator) is transferred to the load and one-half is dissipated or lost in

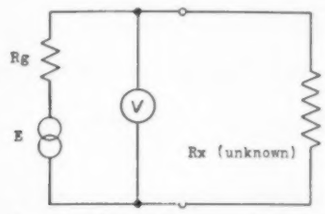

Fig. 28—Circuit for measuring impedance of a load when oscillator output impedance is known.

the internal resistance of the source.

Another interesting observation which we gain from a study of Table 6 is that **the voltage across the load is exactly one-half the generated voltage** (Columns 2 and 3) **when the resistance of the load is equal to the internal resistance of the source.** (Corollary 2)

The above corollaries enable us to conveniently determine the internal impedance of a power source such as an oscillator or a subset. The method employing the first corollary is similar to that followed in preparing Table 6. The oscillator, for example is connected to a calibrated variable resistance across which is bridged a voltmeter of high resistance. The resistance is varied and voltage observations made. By means of formula (5) the power developed in the resistance is computed and a curve plotted; this will have the general shape of the curve shown in Fig. 26. At the maximum point on the curve the generator impedance is equal to the load resistance.

The second method is somewhat simpler. This consists merely of measuring the open circut voltage of the oscillator (or other source of a-c voltage), then connecting the calibrated resistance across the oscillator and adjusting its resistance until the voltmeter reads one-half of the open circuit voltage. The resistance is then equal to the output impedance of the oscillator. Do not be surprised if the two methods are not in exact agreement as a slight amount of inductance in the output of the oscillator will cause some discrepancy. The first of the two methods is generally the more accurate although the second is entirely satisfactory for most tests.

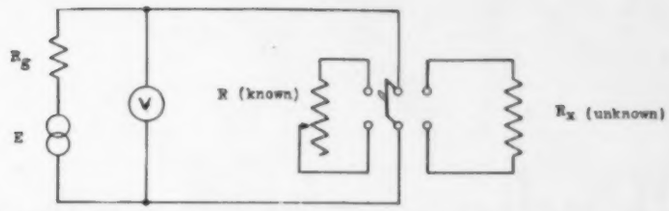

Fig. 27—Circuit for measuring impedance of a load using equivalent resistance.

● The impedance of any unknown load can be determined with an oscillator, voltmeter and resistance using the circuit shown in Fig. 27. The double pole switch is first connected to the unknown load and the voltage adjusted to a given value. Next the switch is thrown to the calibrated resistance which is then adjusted until the voltmeter reading is the same as when the unknown was connected to the oscillator. The unknown impedance is then equal to the known resistance.

If the output impedance of the oscillator is known a somewhat simpler method may be employed based on formulas (1) and (6) (Chapter 1). Fig. 28 shows the connections for this measurement. The open circuit voltage of the oscillator is first measured; then, the unknown load is connected and the voltmeter reading noted. Then by means of formulas (1) and (6) the unknown resistance can be computed. Or by referring to Fig. 29 the impedance of the load may be determined directly. You will observe from this figure (which we learned previously) that when the load resistance is equal to the generator resistance the voltage across the load is one-half of the open circuit voltage. As the load resistance increases the voltage across the load increases until it reaches the open circuit value when the load resistance

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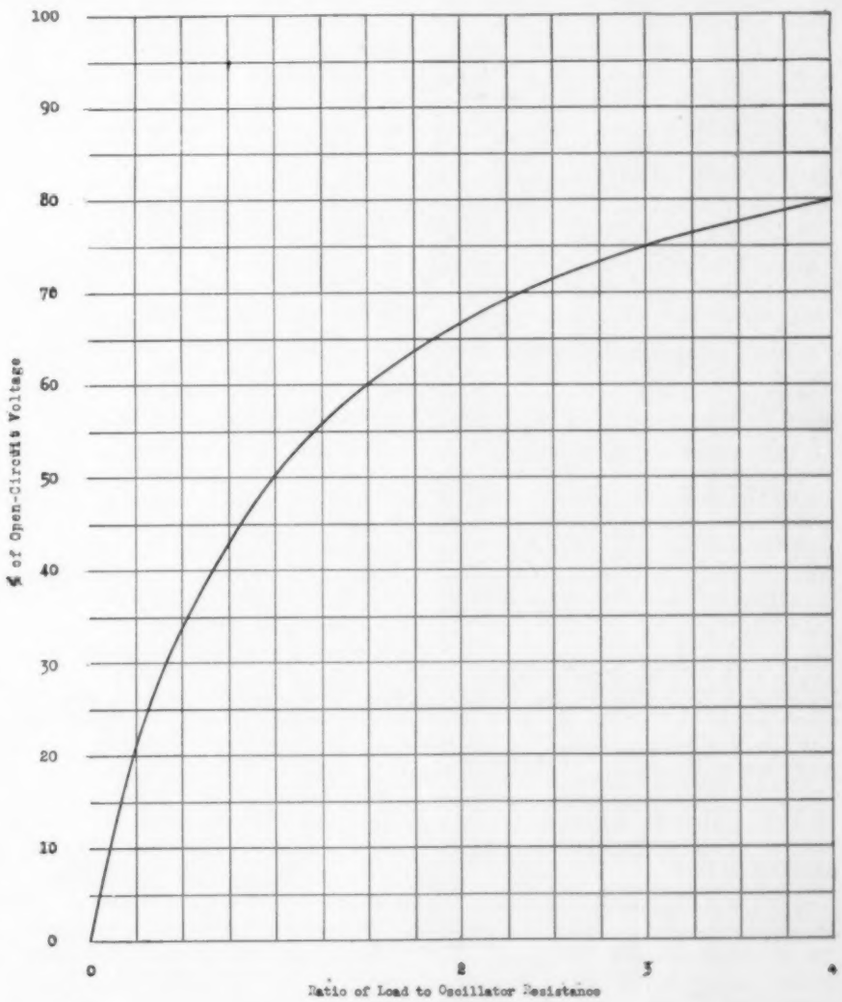

Fig. 29—Curve for use in determining load impedance when oscillator output impedance is known.

By EARL WELTY

Radio Telephoning In Hawaii

The American occupation of the Philippines brought about universal recognition of the necessity of having an All-American communication system across the Pacific

● Thirty-three years ago, January 2, 1903, San Francisco and Honolulu were linked for the first time by a communication system other than sending of letters by steamers. It was on that date that the first cable message ever sent from San Francisco to Honolulu was received in the islands which five years before had been annexed to the United States.

Thus, only half a decade after the western borders of the nation had been extended to islands 2400 miles out in mid-Pacific this then distant section of America was linked to its sister states and territories by a rapid communication system, a forerunner of other systems which in time would bring radio, radiophones and radio broadcasting. The first cable message from San Francisco presaged the day when Hawaii would be joined with other parts of the nation by four commercial radio systems, a cable system, army and navy radios and countless amateur short wave stations.

The tremendous value of having Hawaii an integral part of the United States was recognized during the Spanish-American war when Honolulu was used as a resting point for troops en route to the Philippines. Although Hawaii had sought annexation for many years prior to this date it took such a national survey to bring about actual annexation in 1898.

● This emergency, resulting in American occupation of the Philippines, also brought about an all-American communication system across the Pacific. In speaking of trans-oceanic communications, at that time there was little or no thought of anything other than cable. Gugleilmo Marconi had only recently reached a point in his wireless experiments where he was able to transmit and receive messages across the English channel.

So it was that the project of laying an all-American cable reached Congress, where it received strong support. The Senate passed a bill favoring private construction. The House, although favoring the cable, demanded that it be government owned and constructed. The two houses were unable to reach an agreement on ownership of the cable system which had yet to be built.

This bickering continued until the winter of 1901. Public pressure became heavier for immediate cable laying. Chambers of commerce, civic and private organizations throughout the nation, appealed to congress to speed action. Public opinion was overwhelmingly in favor of immediate decision.

● When it appeared that a delay of possibly years loomed, John W. Mackay then president of the Commercial Cable Co., operating lines across the Atlantic, offered to lay the cable without government subsidy or guarantee of any kind, solely as a private enterprise. This offer focused attention upon the differences in Congress and resulted in the nation's lawmakers deciding against a government cable and arriving at a fair understanding with the cable company for the trans-Pacific system.

Without further delay all soundings and other data along the proposed route were turned over to the company by the United States navy. The navy had for several years been surveying and making soundings in anticipation of such a call.

When the soundings and other data were laid before the engineers of the company it was seen that the engineering project was no small one. The route selected had four great stretches of ocean to span. On the first stretch of 2400 miles from San Francisco to Honolulu there was a mean depth of 2500 fathoms and a maximum of over 3000 fathoms (a fathom is six feet); the second span of 1,254 miles from Honolulu to Midway had a mean depth of 2000 fathoms and a maximum of 3000; the third span of 2593 miles from Midway to Guam had a mean depth of 2600 fathoms and a maximum of 4000; on the fourth and final stretch of 1490 miles from Guam to Manila the mean depth was 2200 fathoms and the maximum 3400. The Midway-Guam span problem was further complicated by sudden and great fluctuations in the ocean's bed.

● Full appreciation of what laying a cable at such depths in open sea means is seen when engineers point out that with the cable laying ship steaming at eight knots over water 2000 fathoms deep approximately 25 miles of cable is suspended in the water at all times. In fact, it takes something like 2½ hours for a section of cable to touch the ocean's bottom from the time it leaves the ship's deck.

Such problems did not daunt or delay the engineers. On December 4, 1902, the cableship "Silvertown," out of Lon-

don, came steaming through the Golden Gate with the first section of what was to be an all-American cable spanning the Pacific. Aboard the "Silvertown" as she reached her wharf at San Francisco were 2413 nautical miles of cable weighing 4807 tons.

San Francisco, recognizing the importance of the event, held appropriate ceremonies as the eastern end of the great cable was taken ashore and anchored on the soil of California. On December 15, 1902, the "Silvertown" reversed her course, heading out through the Golden Gate, passing the Farallones with her bow pointed for the Hawaiian Islands, the newest bid of land to become a part of the nation.

● For the next 11 days the "Silvertown" ploughed steadily westward. The morning of December 26, while some 35 miles off Honolulu, a heavy gale swept down from the north, forcing the ship to hove to. A buoy was placed on the cable. For two days the "Silvertown" rode out the storm and on the morning of December 28 the unbroken cable which stretched back 2400 miles to San Francisco was brought ashore at Honolulu.

Actual landing of the cable was an event celebrated as widely in Hawaii as the beginning of the enterprise had been celebrated in San Francisco. The great snake-like metal cable was pulled ashore by a small donkey engine stationed in the grounds of Sans Souci at Waikiki Beach, at one time the dwelling place of Robert Louis Stevenson. Just at sunset the cable's end reached shore. Men, women, alike, rushed to the spot, seized and almost by main force, bolstered by tremendous enthusiasm, pulled it to the cable house anchorage.

During this public participation in the cable laying, Mrs. Alexander G. Hawes, wife of the aide to Sanford Dole, territorial governor, placed a beautiful Hawaiian flower lei around the cable. "I salute thee, O Pacific cable," she said.

● On January 2, 1903, the first messages were sent and received. The first official message following those used in testing the line is believed to have been from President Theodore Roosevelt to Henry E. Cooper, secretary of the newly formed territory. In this message he congratulated the people of the islands upon being brought so close to the rest of the nation. Almost every member of congress, including such notables as "Uncle Joe" Cannon and Henry Cabot Lodge, took the opportunity of cabling felicitations.

That day was a momentous one for Honolulu. Following the sending of the initial messages in the morning a great mass meeting of celebration was held on the grounds of the capitol which only a few years before had been a royal palace. In the evening a brilliant reception and ball was held in the former throne room. Capt. Henri Berger, famed Prussian organizer of the Royal Hawaiian Band, wrote a special march for the occasion. Few numbers, other than this special march, were played by the band that evening as the crowd demanded it be repeated time after time. So huge was the crowd at the capitol it overflowed into the streets of the city, resulting in numerous impromptu parades and celebrations.

Unless one has been more or less isolated upon the islands 2400 miles from continental United States with the only means of communication by sailing ships and steamers, one cannot fully appreciate what the coming of cable communications meant to the Hawaiian Islands of that day. Well did they deserve to hold their celebrations over an event which put them in almost instant communication with mainland America and enabled them to communicate with Washington, capitol of the nation of which they had so recently become citizens.

● No longer was Honolulu and the Territory of Hawaii cut off from the rest of the nation by 2400 miles of open sea. The cable had brought the islands within a few minutes of San Francisco and other continental points. Hawaii at last was joined to the Union not alone by sentiment, by government, by law and treaty, but by a strand of copper through which constant and immediate communication could be maintained.

Hawaii was doubly happy over the successful operation of the cable. Years before, back in 1889, an attempt had been made to lay cables between the island of the archipelago, from Kauai, 100 miles to the northwest to Hawaii, 200 miles to the southeast. True, after several disheartening attempts, made more difficult because of the jagged, lava bottom and depth of the sea surrounding the islands, a cable was laid from Koko Head, near Honolulu to Molokai island, 60 miles distant. Only one message had gone over the system before it went out of operation. Only one message and the cable broke. The cable was never repaired.

About this time, too, Marconi was beginning to get results with his wireless experiments. If they were successful there would be no necessity for using cables between the islands. This factor, perhaps, rather than financial fear or engineering difficulties, deterred the island people from proceeding farther with inter-island cable laying attempts. The people of Hawaii, judging from the great handicaps they have surmounted in the development of their splendid and praiseworthy sugar and pineapple industries, would not have been deterred from continuing their efforts if there had been necessity for an inter-island cable system.

In 1901 Inter-Island Wireless Telegraph Co. was established. On March of that same year, just 24 months after Marconi had sent his first message across the English Channel, the five principal islands of the Territory of Hawaii were joined by a commercial radio system.

● From 1903 until 1914 Hawaii depended solely for its fast commercial communication upon the cable to San Fran-

(Please turn to page 34)

"I AM THE TELEPHONE"

Here is a little prose-poem which contains every talking point needed in selling telephone service. The poem was written by T. Harry Thompson, Columnist of *Sales Management*.

"I am the telephone, friend of rich and poor alike. My body is brass and my heart, gold. My arms reach around the world and enfold it to my bosom. Through them courses electricity, my life fluid. I speak all languages.

"Mine is the voice of commerce and romance. I transact business for the millions and convey the love notes of the world. I announce glad tidings of weddings, births, graduations, promotions. It is my equal duty to echo when a sob vibrates into the night. I am the voice of man . . . amplified, magnified, ramified.

"Routine is not beneath my dignity, I will order a limousine and a bag of salt in the same breath. I will send for a doctor, or summon a priest. I make hazardous the work of the prowler, and peaceful the slumber of all. A word from me and the community's firemen leap into action.

"I am the telephone, companion of the many. I am a friend to the lonely, to the shut-in. I send the traveler on his way with the assurance that I shall keep watch in his absence; that I shall notify him in an emergency; that I shall take to him the voices of his loved ones (and his to them), though sea and mountain separate them.

"My credo is service . . . . you have but to ask, I am the telephone."

LINE and DESK

RAY BLAIN, Member A. I. E. E., Editor

Q. What type of solder is recommended for sealing seams in a split sleeve of a cable splice?

A. Bar solder containing 50 per cent tin and 50 per cent lead is usually considered best for this purpose. Wire solder with a sterine center is now available for this purpose and can be used if desired.

Q. What size wire should be used to furnish ringing current for a two-position switchboard?

A. Ordinarily No. 14 copper paired wire with BRC insulation will be adequate for this purpose. Smaller wire of course could be though it presents no particular advantage.

Q. How many cells of storage battery is required for a 24-volt common battery switchboard?

A. On the ordinary switchboard 11 cells are considered standard and adequate. With this battery voltage may fluctuate between 22 and 26 volts according to the charging method used. The present day common battery manual switchboards are designed to operate satisfactorily over a reasonable voltage range.

Q. When house wire has green and red tracers which color should be used for the battery side of the line?

A. It really does not make any difference providing the same color is used for the battery side on all stations. It is usually customary to use the red tracer for the "Battery" or "Ring" side of the line.

Q. On a floor type mainframe should jumper wires be run through only one or two rings?

A. Jumpers never should be run through more than one ring on a frame of this type. Jumpers on the horizontal side fan-out and pass through a ring and then fan-out on the vertical side. This is the only manner in which jumpers can be run and not cause congestion in some of the rings.

Q. What resistance should a voltmeter have for testing subscribers' lines in a Common Battery manual exchange?

A. Voltmeters of 10,000 ohms are ordinarily used and generally considered satisfactory in a manual exchange. Some companies prefer a 100,000 ohm meter though this type is super sensative. When a 100,000 meter is used we prefer that it be equipped with a suitable shunt in order that its resistance may be reduced to 10,000 ohms when desired.

Q. We find that our open iron wire circuits over railroad tracks corrode rapidly due to coal smoke from passing trains and must be replaced frequently. Would you recommend the use of insulated wire?

A. It is doubtful that rubber insulation could be obtained that would greatly prolong the life of the wire in this location. We suggest that the track span and one on each side be strung with either copper or Copperweld wire.

Q. We have some lateral cables which come up out of the ground about two feet and then pass through a wall to a cable terminal inside the building. How can the cable outside the building be best protected to prevent mechanical injury?

A. We suggest the use of a cable U-guard about three feet long. This guard may be attached to the building with suitable cleats and the upper end closed with cement if considered necessary. The guard should be stuffed with paper before the cement is applied.

Q. Do you consider a three-position non--multiple switchboard practicable for ordinary use in the average exchange?

A. Ordinarily a non-multiple switchboard should not have more than two-positions as with three-positions the end operators are unable to reach over the entire face of the switchboard. Should such a switchboard be installed transfer trunks would be necessary and two operators to complete some of the calls. A third position on a non-multiple switchboard can sometimes be used to advantage for rural and toll purposes. Ordinarily though a three-position should be of the multiple type.

Q. Should the route of an underground tape armored cable be marked and if so, how?

A. It is usually considered necessary to mark the route of such a cable in order that it may be located easily and quickly in case of trouble. Ordinarily a concrete marker extending only a few inches above the ground is considered adequate. These markers should be placed at each splice and at regular intervals along the cable run. The splice markers should be properly designated.

Q. We have a rural line of seven stations all of which are called with code rings. We desire to call one of these stations without disturbing the other subscribers on the line. Any suggestions as to how this may be accomplished will be greatly appreciated.

A. We suggest that a special harmonic ringer be placed in this instrument and a higher frequency, say 66-cycle, be used when calling this special station. If other subscribers on the line desire to call this station they will be required to go through the switchboard. If the switchboard is not equipped for harmonic ringing it will be necessary to devise some means of switching the higher frequency on the line when calling the special station.

Q. Please suggest a desirable system of storing used telephones in the storeroom?

A. Various systems are in successful use though we have found the following entirely successful after several years use. When a telephone is removed overhaul it completely, replacing any defective parts. Worn cords, cracked receiver shells or mouth pieces should never be neglected. Neither should its appearance be neglected as it should be cleaned thoroughly and polished so that it has all appearances of a new instrument. The set should next be thoroughly tested, wrapped securely in paper and placed on a shelf in the storeroom until required. Many companies save this overhaul of instruments until a rainy day when all men cannot be used to advantage on the outside.

Q. We experience considerable difficulty in the removal of dust from our telephone equipment. We find that dusting of the key shelf of the switchboard, especially between the plugs, is difficult and seldom done properly. When a man is assigned to dusting off cable forms trouble is generally caused by breaking off skinners. The wiring on

(Please turn to page 34)

Minding OUR Business

By PHILIP D. SHEA
Chief Engineer's Dept.
N. Y. Telephone Co.

● Naturally enough, the giving of telephone service is a complicated task. While each of us may be reasonably confident of our ability to do our own particular job well, how much do we really know about the general phases of the telephone business? About how other assignments are carried out? Why some things have to be done a specific way? Why certain charges are made? Why certain policies have been adopted, etc? None of us will ever know all there is to be known about the telephone business, but there are many phases of it with which we should all be more familiar.

To the public at large the telephone company is something impersonal. The only personal contact the average person makes with our business is through the employees. To the public *we* are the telephone company—You and I. People expect to be able to discuss telephone questions with *us*, and they expect *us* to know the answers.

● What kind of job have we been doing in this regard? Have we read and studied carefully the facts regarding controversial matters and the explanations of company policies and practices which have been issued from time to time? Have we known the answers? Have we been able to discuss satisfactorily our friends' questions and misunderstandings so that they realize what we are striving to do in the telephone business? Have we convinced them that we are trying to give the best possible service which ingenuity, resourcefulness and devotion to an ideal can provide?

Abraham Lincoln once said—"With public sentiment nothing can fail; without it nothing can succeed." This is particularly true in our business, because we are a public utility. The continued success of our business depends to a great extent upon the good will of the public, which is in turn based on understanding and knowledge of the company's practices. Each of us in our own sphere can help to build and maintain that understanding if each of us learns the facts about the various phases of our business.

● We all have friends and acquaintances who from time to time ask us questions, or make comments to us about the telephone company. This is *our* opportunity to present the facts which we have learned from reading and studying the various Information Bulletins which have been distributed. We can explain and discuss our company's policies and practices if our friends' comments indicate that such misunderstandings exist.

Misunderstandings are injurious—they result in biased opinion and prejudice which makes for suspicious attitude toward the company. Usually they are due to misconception of the company's aims and purposes. If permitted to continue the misunderstanding may grow and assume dangerous proportions. On the contrary, understanding and information about the company makes for confidence. A president of a large business put it in these words: "While it is essential that the corporation understand the public, it is equally essential that the public undersand the corporation." So, it is an important part of our job, at all times, to try to clear up misunderstandings and to answer questions.

Criticisms are something to "warm up" to rather than to get "warm about." A knock often may be turned into a boost if the facts are properly presented. Each complaint, therefore, should be looked upon as an opportunity either to correct something that needs correction, or to clear up a misunderstanding.

● The attitude and knowledge we display as we discuss telephone matters will have a great deal to do with shaping or changing the opinion of people toward our business. If we are negative in our attitude, and if our explanation is weak because of lack of knowledge, we may be sure the impression we make will be negative; and the company suffers. On the other hand, if we reveal a familiarity with the general phases of our business; if we manifest interest, sincerity, directness, frankness, and loyality; if we show a disposition to sit down with people and talk it over; if we let them know that we, that *all* telephone people *want*, to please our customers, *want* to help them in their telephone problems, *want* to be fair with them, and all we ask is that they be fair with us;—then the effect will be as satisfying to the public as it may be surprising to ourselves.

The majority of folks are fair-minded and will listen when the subject is properly presented, for it is human nature to desire friendly relations. All problems with the public can best be solved if we get down to the human element, man to man, and discuss things in an old-fashioned, human manner. The public should know that we, as telephone people, are sincerely anxious to talk over telephone matters, and are glad to discuss any situation frankly and honestly in a *common sense manner*.

This article, reprinted from the March, 1936 issue of *Telephone Review*, points out clearly how every telephone employee can do his part to build up the public relations that have been torn down by demagog politicians the past few years. While it is written for Bell people it is applicable to all Independents and should be brought to the attention of every employee

● When a friend or acquaintance asks why a certain thing is done in a certain way by the company, *never* resort to the old excuses that "it is the rule," or "it is the policy." If we don't know the answer, let's not bluff. Instead let's tell him that we shall find out what the reason is; that we feel it must be right because the company has a good reason for everything it does; and that we will let him know.

Then find out what the reason is. *Any* one of us can at *any* time get from our supervisor the answer to *any* question we receive from the public or which might arise in our own minds. So let's not hesitate to ask! And our attitude toward the public in this regard should be: "I will answer *any* question about the telephone business you wish to ask, and if I don't know the answer, I will get it for you." . . . .

Sales and good public relations are closely related. In all our sales contacts we should approach our acquaintances in the spirit of being of assistance—making sure they understand our service and are using it to their best advantage. In this as in other regards we should try to make is apparent that we are a *service* organization doing our best to fulfill our obligation to the public—that we are a progressive group of interested and loyal employees ready to serve at all times.

● It would be helpful if we made it a practice to read our telephone advertisements so that we can be prepared to discuss the subjects covered. Although our advertisements are designed primarily to sell new business, they also contain general information of interest to the public. Advertisements reach many people, but reinforced by a large employee body able to discuss them, they can be made more effective.

Most people do not realize the great number of persons who own, and the great army of individuals who operate the telephone system. They know our service is accepted the world over as the best, but they fail to understand how it came to be the best. . . .

Telephone advertising is continually telling the kind of story every one of us should know by heart. We should read these advertisements because there is much in them we can use to our own, and the company's advantage.

● We believe in our kind of organization. We want the public to believe in it and in us. We want the public to know that the things we do in our business are the right things to do—if they were not, we would not do them. . . . .

You yourself can do much—all together we can do a real job—to merit and build good will for our company. . . . *IF* every one of us *knows* and *uses* to *advantage* the real story of the telephone business—our business. Let's MIND OUR BUSINESS, then; let's watch out for its welfare at all times, each in our own particular assignments and especially in our contacts with the public both on and off the job.

Telephone Transmission—Theory and Practice

(Continued from page 17)

approaches infinity (infinity is an exceedingly large value).

The methods of measuring a-c impedance described above are somewhat crude and not highly precise as we neglect the effort of reactance in the circuit. However, they are sufficiently accurate for many purposes and do not require expensive testing apparatus. You may wonder why the necessity for knowing the impedance of telephone lines and apparatus. The answer is found in the first corollary mentioned in the beginning of this chapter. The job of the telephone engineer is to obtain as much energy as practicable from the source (usually the transmitter) and then deliver as much of that energy as possible to the receiving device (the telephone receiver). To do this the components of telephone apparatus which are connected together must all have the same impedance (practically speaking). Furthermore we will find in our study of telephone repeaters (in subsequent chapters) that proper matching of impedances is essential for successful repeater operation.

It so happens that the impedance of a copper open-wire line is approximately 600 ohms. This led to the adoption of 600 ohms as the nominal impedance of telephone apparatus such as subscribers telephone sets, switchboards, telephone repeaters, carrier telephone and telegraph equipment, etc. Non-loaded telephone cable has a considerably lower impedance and therefore unless means are taken to properly match the telephone apparatus and the cable impedances, the efficiency may be seriously impaired and unnecessary loss incurred.

(TO BE CONTINUED)

I. T. & T. Bond Issue Plans Shelved

The International Telephone and Telegraph Corp. has shelved its plan to sell about $25,000,000 of convertible debentures to its stockholders, Sosthenes Behn, president, said in a statement accompanying the 1935 pamphlet report.

He reported consolidated net income for the system of $5,787,411, excluding results of the Postal Telegraph and Cable Corp, equal to 90 cents a share, the same as issued in the preliminary report. That compared with net of $3,554,058, or 55 cents a share, for 1934, before deducting a loss of $1,474,488 for the postal corporation.

Referring to shelving of the convertible debenture plan Behn said:

"In view of changed conditions in the securities market your board of directors is not proceeding with the matter for the present."

On March 18 the president announced the company planned to fund $23,360,000 of bank loans and to retire part of its $37,661,100 of convertible 4½ per cent debentures due in 1939 with funds to be derived from the sale of new debentures to stockholders.

In reference to the bank loans, Behn said, he "was pleased to advise" that the group of banks holding the $23,360,000 of notes of certain telephone operating subsidiaries extended such indebtedness with a reduction in the interest rate to 4 per cent instead of 4½ per cent.

Reviews Depreciation Rate Plea

The Northwestern Bell Telephone Co. has renewed requests before the Nebraska Railway Commission for a 4.48 per cent depreciation rate on approximately 25 million dollars worth of Nebraska property.

Commissioner Floyd L. Bollen conducted a brief hearing on a commission order for the company to show cause why the commission rate of 3.82 per cent for 1935 should not be continued in 1936.

Holds Telephone Rates Not Under City Rule

Telephone charges are a matter for the state public utilities commission to handle, City Attorney Ganson Taggart of Grand Rapids stated in an opinion prepared for the city commission.

He was asked to look into the matter after City Commissioner Henry W. Walstrom introduced a resolution, seeking to have the telephone company required to eliminate its service charge on incompleted long distance calls.

"An incompleted call necessarily involves a service on the part of the company, even though the party desired is not reached," the opinion states.

"The question of the phone rates is entirely in the hands of the utilities commission and, as I understand, the rate charged is that fixed by said commission and published in connection with their toll tariffs.

"The matter is not within the jurisdiction of the city commission, but, as stated, the state utilities commission."

Manager Resigns

Ralph Baker, manager of the Grand Rapids Mutual Telephone Co., has resigned. Charles Crobarger, Napoleon, took his place May 1.

lew Jumper Wire

MONOTYPE JUMPER WIRE

IE REQUISITES ST PERFORMANCE

d" a jumper wire as the best product now avail-
high accomplishment. But "just as good" was
utomatic Electric engineers. They refused to be
developed something infinitely *better*. This bet-
ype Jumper Wire—a wire of small diameter,
exclusive process.

conducted comparative tests, this new wire has
superior on seven different points—each one
phase of the everyday use of this type of wire.

per wire, you need not *guess* whether or not you
oduct obtainable. You can order Monotype and

of superiority tabulated at the right. Write for
Then, next time you need jumper wire, specify
t, you'll not want any other kind.

Proved Better By the Most Exhaustive Laboratory Tests that Science Can Devise!

- HIGHER INSULATION RESISTANCE—At average room temperature and humidity, Monotype Jumper Wire shows substantially higher insulation resistance than any other make tested.
- WITHSTANDS MOISTURE BETTER—Monotype insulation resistance, under conditions of higher temperature and humidity, is several times as high as that of other types.
- BETTER INSULATION RECOVERY—Monotype insulation recovery, after drying out, is practically 100%. No other type approaches this performance.
- HIGHER "KINK TEST" INSULATION—The foregoing insulation tests show even more startling contrast when made with "kinked" wire.
- BETTER FLAME PROOFING—Burning rate of Monotype wire is appreciably lower.
- COMPLETE PROTECTION AGAINST CORROSION—Monotype insulation is not only non-corrosive, but completely safeguards the conductor from external influence.
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RAMBLEGRAPHS

By J. A. Smith

The Texas Telephone Association sponsored one of its best three-day conventions during March. Pioneers in the telephone industry were in evidence, along with the "new blood" who have entered since Rambler removed to Chicago. But every one was in earnest to make the convention and the industry a better one in which to associate.

* * *

A novel "stunt" to attract interest among members was presented by Secretary Stewart when he had the Postal Telegraph company deliver telegrams to members registered calling their attention to the program to be rendered the following morning. These telegrams read as follows:

—

J. A. Smith, Pub. Telephone Engineer, Baker Hotel, Dallas, Texas.

Several distinguished speakers will appear on our program this morning. We are depending upon you to be present at the opening of the general assembly on Peacock Terrace at 9:30 o'clock to lend your compliments to these estimable gentlemen.

(Signed) Oscar Burton, President.

—

The publicity thus given was responded to by those receiving the telegrams.

* * *

Stanley Edwards, editor of Telephony, was introduced to both the Texas and Oklahoma conventions. He remained in the south to attend the Oklahoma meeting one week later. The weather was ideal and he made the most of it.

* * *

John Stratton, who represented Kellogg Switchboard & Supply company since the Lord knows when, but who "went upon his own" a few years ago and bought telephone properties, couldn't stand the gaff and, like the old fire horse, returned to his first love. We found him around the convention floor, but representing the General Electric company in the Dallas territory.

* * *

T. P. Bearden, who was reported by Rambler last month as being too ill to attend the convention, just couldn't stay away, so he donned the old hat, brought his son along for a prop in case he needed extra strength, and attended several sessions.

Herb Clark, representing the Suttle Equipment company of Lawrenceville, Illinois, exhibited at both conventions. He wasn't the only one to exhibit, however, but he was one of the few to get down that far for the first time.

* * *

R. B. Still wired his regrets from Bloomington, Ill., where he is now located, that he would be unable to attend, but that Mrs. Still would be present at some of the sessions.

* * *

With pardonable pride Rambler acknowledges many courtesies while attending both Texas and Oklahoma conventions. He was given every consideration at these meetings.

* * *

We learned through C. A. Vedder that Mr. and Mrs. P. Kerr Higgins are enjoying a trip to Cuba this month. They left their St. Louis home during February for a trip through tropical Cuba this spring.

* * *

John W. Miller, vice-president of the Gulf States Telephone company at Tyler, was recently named head of the Tyler chamber of commerce. Oscar Burton, chairman of the Tyler city commission and general manager of the Gulf States Telephone company was elected first vice-president of the chamber of commerce. Thus is the Gulf States Telephone company doubly honored by Tyler.

* * *

At Oklahoma City Rambler again this year addressed the Oklahoma Telephone convention. Here he met many of the old timers in the telephone industry and made the acquaintance of others. By the way the recently organized "Oklahoma Telephone Association" held a very enthusiastic convention which was well attended. Congratulations, Hube.

It is seldom that we mention matters outside the telephone industry in this column, but we want to indulge the patience of our readers long enough to tell them of the vast building program of Oklahoma City. Upon arriving we phoned our old friend, Earl Shotwell, that we were stopping over for a day or two. Immediately Mrs. Shotwell drove the big car down to the Huckins and insisted that Rambler, the Missus and the Miss, comprising Rambler group, accompany her upon a trip through the residential section of that progressive city. During the afternoon drive we saw more residences under construction than in all other cities combined during the past year. Later the golf-playing Mr. Shotwell joined the party which terminated at a late hour after a dinner and show program.

* * *

C. G. Gardner, manager of the Sentinal Telephone company and receiver for the Standard Telephone company in Oklahoma, reported that all of the nineteen exchanges in Oklahoma formerly under the control of the Standard Telephone company had been sold to Independents. That's fine.

* * *

Rambler regrets to chronicle the death of another very personal friend in the person of C. J. McMahon, manager of the Wayne Telephone company, Wayne, W. Va., and secretary of the West Virginia Telephone association. In the passing of this gentleman West Virginia has lost a very valuable member of the telephone industry and Rambler sustains the loss of a very dear friend.

* * *

Fellow way down in Texas writes to ask if the name of Oscar Burton, reelected president of the Texas Telephone Association, was omitted from the writeup of the Texas convention proceedings on purpose. Answered that our skirts, union or pajamas were clear because we checked the copy to see who was at fault and found the printer and proofreader failed to follow copy. For which we offer our profound apologies to both Mr. Burton and the Texas Telephone Association.

Name Omitted Through Error

It is with a degree of regret and humiliation that we noted upon receiving copy of the April issue of TELEPHONE ENGINEER that the name of Oscar Burton was omitted from the list of officers elected at the annual meeting of the Texas Telephone Association, in Dallas. To us this seems almost like an unpardonable sin for Mr. Burton has made an outstanding record as president of that organization and his efforts command the highest admiration.

Editorial « « «

Popular Ownership In The Telephone Industry

● In the year of a presidential campaign, we must always look for a recurrence of efforts to inject into the campaign such questions as government ownership of public utilities.

Judging by the activities of members of the two old-line parties during the past few years, it isn't a difficult task to figure out just how the platforms of these parties will deal with the subject of governmen ownership of utilities.

Republicans in general, as in the past, will undoubtedly be opposed to all attempts to put the government into business. The Democraic party is split into two warring factions; that composing the so-called Jeffersonian Democrats opposed to the government's entrance into business; and that group, plus a few disgruntled radical Republicans, following the present administration, which on past performance seems to favor making Uncle Sam a competitor of private enterprise. Present indications point to domination in forming the Democratic platform by the latter group.

● But, regardless of what will be written into the Republican and Democratic platforms, there never has been a real demand for government ownership of the telephone industry either from the employees or from the general public. The principle of popular ownership and operation probably has been carried farther in this than in any of the great industries. A large percentage of telephone workers are owners of securities of the companies which engage their services. The number of telephone users who own shares in the companies that serve them runs into the hundreds of thousands.

The workers feel that they are represented in the management through their employees' associations and through the fact that executives, in general, have been promoted from the ranks. They are getting a share of the returns through dividends on their stock.

● Stockholder-subscribers likewise are participating in the returns, although they participate in management only through delegated authority. The management, however, cannot adopt policies that are adverse to the interests of a large proportion of the stockholders from whom authority is derived.

The telephone business already has made great strides toward popular ownership and management, and, in view of further progress in both now taking place, the spectre of government ownership of the industry should be laid now and for all time.

There's Still A Job To Be Done

● Last year at about this time we published an editorial showing that there were more radio sets and automobiles than telephones in use in this country. Then, we said, "There's a Job to Be Done." After reading the following figures, we again say "There's a Job to Be Done" by telephone men.

There are twice as many radio homes as telephone homes in the United States, and four million more radios than passenger automobiles, according to the latest available figures just published.

On Jan. 1, 1935, according to the official estimate of the National Automobile Chamber of Commerce, there were 21,430,000 passenger automobiles, representing total car registrations.

This figure compares with 25,551,569 radio sets, which are distributed in 21,455,799 radio homes. As of Jan. 1, 1935, there were 10,600,000 telephone homes, according to estimates of the American Telephone & Telegraph Co. This indicates that there are now more than twice as many radio homes as telephone homes in the United States.

ANNOUNCEMENT

TELEPHONE ENGINEER is now $1.00 a year instead of $2.00 and $2.00 for three years instead of $5.00.

This change in price is due to the fact that for almost a year we have been doing without the services of subscription agency salesmen whose compensation virtually required us to hold to the $2.00 and $5.00 rates.

These agency men caused us no end of trouble with their promises of publicity, premiums and cut rates for "renewal" subscriptions that never reached our office, which was brought to our attention only when we started doing business with the industry by mail.

We believe the best way to eliminate the pests who are causing this trouble is to lower our subscription rates, eliminate the commission paid to circulation men, and do business with you by mail and direct contact.

If you feel this is a sensible decision and want to help us eliminate this trouble we ask that you support TELEPHONE ENGINEER in its stand by transacting all subscription matters by mail.

"Tapping In" On Washington

(Continued from page 14)

at the advent of the handset telephone. This meant that the risks of obsolescence of the desk sets was passed onto the associated companies while the A. T. & T. was able to sell at a profit the hand sets to the operating carriers.

● In trying to establish the theory that the license contract services should not be rendered a the present 1½ per cent of the gross revenues of the associated companies, Special Counsel Becker delved into ancient history of the telephone industry — tracing the relationships of the parent company to the associated companies from the early days of telephony under the old patent instrument rental agreements through the various forms of license contracts with their different percentages of charges to the operating carriers. He tried to show that the present license contracts were outgrowths of the old rental agreements and that the latter carried no provisions for service payments by the operating companies. He built up a theory that the A. T. & T. because of the valuable returns from its early rental agreements and through the acquisition of franchise or bonus stock of the operating companies should furnish the present license services without cost because it was really protecting its $2,000,000,000 investment in the Bell System companies through research, engineering and other services. He tried to develop that the present $13,000,000 payment each year by the associated companies under the license contracts merely supported the "holding company" activities of the A. T. & T. It has been claimed in frequent commission and court cases by the A. T. & T. that the $13,000,000 payment fell far short of the cost of the services as in 1934 the services furnished the associated companies were estimated to cost $22,000,000 of which the major items were the Bell Laboratories research and engineering assistance.

In questioning the A. T. & T. officials, FCC Counsel Becker tried to show conflict of views on the part of Comptroller Heiss and his two aides, Crunden and Green, in recent Wisconsin commission rate and tax cases with opinions of "voices from the grave"— the latter being the testimony of a number of deceased officials of the A. T. & T., including former president, Theodore N. Vail; Edward F. Hall; chief engineer, Hammond V. Hayes; given in 1909-11 during the retrial of the old Western Union patent dispute against the A. T. & T., which had been in litigation since 1883. On numerous occasions, the FCC counsel expressed surprise that the three accounting officials, whom he termed a "flying squadron of rate case witnesses" had not studied this Western Union case.

● The delving into past history precipitated a remark by A. T. & T. President Gifford that "past history does not interest me as much as the present—I am trying to give telephone service today not 30 years ago". This statement aroused Special Counsel Becker to have it stricken from the record but Telephone Division Commissioners Brown, Prall and Walker overruled him. On the sale of the instruments to associated companies in 1927, President Gifford denied that a profit of $14,000,000 was made by the A. T. & T. but that most of this amount was to replace previous depreciation reserve allotted against these instruments out of the parent company's surplus. He stressed that in 1927 the sale in no way was motivated by the fact of the advent of the handset and if the depression had not intervened the handset today would not be such a large proportion of the telephones of the country as prior to 1931 telephone stations were increasing about 800,000 a year. He regarded the charge for handsets as a discouragement charge to mean orderly distribution of these telephones to the public, but admitted that during the depression the receipts from the handset charges had been a revenue factor. However, these charges were being eliminated or reduced as rapidly as possible. On the 1927 instrument sale, Special Counsel Becker summoned to Washington two A. T. & T. directors—George F. Baker, chairman of the First National Bank of New York, and David F. Houston, former Secretary of Agriculture and the Treasury under President Wilson—to find out what they recalled about the executive committee and directors' discussion of that transaction. They remembered nothing. In fact, the goal of the FCC counsel for direct affirmative or negative — "yes" or "no" — answers which he had sought on frequent occasions from A. T. & T. officials was fully achieved in his questioning of the two directors as such replies was about all he obtained during their brief 15-minute examination.

In his testimony, Mr. Bickley claimed that the A. T. & T. had not complied with the Supreme Court decision in the Illinois Bell rate case of 1930 in showing the cost of license contract services to the associated companies. Under the old rental agreements the FCC chief accountant charged that the A. T. & T. had gained huge profits in franchise stock and rental payments, the latter in the early years amounting to approximately one-sixth the average annual revenue per station. Since the license service contracts were inaugurated, these payments by the associated companies to the A. T. & T. had aggregated from 1902-27, $333,000,000.

The Bell System pension plan came under fire as favoring the high-salaried executives with disproportionate retirement allowances while the pension accruals came out of operating expenses and in the final analysis were contributed by the telephone subscriber. Such formed the high spots of the testimony of Harold Huling, investigation accountant. The probe of the pension system was regarded as one of the most vulnerable points in the investigation as it disclosed 33 executives out of the present 4,959 pensioners receiving 8.5 per cent of the total retirement payments. In one case a former A. T. & T. board chairman received an annual pension of $55,000. Chairman Walker indicated that the Commission would seek to regulate the pension payments by ruling upon their payment out of operating expenses either altogether or by stipulating a maximum allowance to be paid under such an arrangement. The FCC accountant cited that non-plant employees or executives received substantially higher pensions than plant employees because in the former's case the salary level reached higher peaks as the length of his service went on.

Rural Electrification Bill Sent to President

The 410 million dollar rural electrification bill, sponsored by Senator George W. Norris (Radical, Neb.) was sent to the White House May 15. Senate acceptance of a conference agreement on the measure speeded it to President Roosevelt.

The bill authorizes a ten-year program of loans to farm groups and private companies to aid in providing rural areas with electricity. It provides that the Rural Electrification Administration, which is to control the fund, give preference to non-profit organizations as against private concerns in keeping with the New Deal's drive on private enterprise in the power industry.

The measure authorizes the RFC to make a loan of 50 million dollars in the first year to the REA. Annual appropriations of 40 million dollars are to be made thereafter.

President Roosevelt is expected to sign the measure for the senator who led the fight for the New Deal's greatest power venture, the Tennessee Valley Authority.

Appeals Telegram Seizure Case to Supreme Court

Elisha Hanson, attorney for William Randolph Hearst, newspaper publisher, on April 29, appealed to the United States Supreme Court from the decision of the District of Columbia Supreme Court in Mr. Hearst's suit for an injunction restraining the Black senate lobby investigating committee from seizing and making use of telegrams, subpenaed from files of the Western Union Telegraph Co., exchanged between the publisher and his editorial employees, through the cooperation of the Federal Communications Commission.

In denying the injunction, on April 8, the District of Columbia court held the court was without jurisdiction, so far as the Senate committee was concerned and that it was better "to leave us without any remedy than it is for a court to assume jurisdiction to try to coerce or control a committee of the Senate."

Show This Article To Your Local Grocer

From telephone to telephones! From painting a picture of a huge telephone instrument on a window to a position of jurisdiction over the 18 trunk lines that comprise the order department of Quincy's largest grocery establishment! That is the story of the man whose voice is more familiar to housewives around Quincy, Mass., than that of Amos and Andy or even Major Bowes.

A few years ago Billy MacDonald, engaged in Foy's Market in caring for the wants of the fish buying public, and tucking in the little fishes for the night, was found to have a talent for painting. His alert employers were not slow to do something about it, and Billy was subsequently kept busy making pictures on the window of the store.

In the course of time there appeared on this window a drawing of the very grandaddy of telephones. An advertising official of the telephone company passed that way and the next issue of the telephone trade booklet carried a photograph of the window, including Billy. Whether this incident rendered Billy telephone conscious he does not say, but from that time telephones have played a large part in his career. From meeting his customers over a counter he passed to the habit of calling them on the phone; and it has been said that he is largely responsible for the vast amount of business that is done by telephone in Quincy today. The housewives who have been approached on the subject agree that his voice has what it takes to solve their grocery problems.

MacDonald may be seen any day at Foy's Hancock street store wearing a telephone around his neck with all the nonchalance of a debutante wearing her new Easter bonnet. He is never without it in the store; simply steps to the switchboard and plugs in when the signal calls. Asked what is the secret of interviewing customers over the wire, he said: "I do think there is a definite technique in telephone salesmanship, and young men and women who are preparing for a career of selling should study it. The telephone is a large part of any salesman's job, and the approach is altogether different from the old direct method." Regarding business conditions he said, "There have been greater changes in business in the last five years than in the previous twenty; and the telephone had had a lot to do with it."—**Quincy (Mass.) Ledger.**

Cuban Telephone Shows Increase in Revenues

Report of Cuban Telephone Co., subsidiary of International Telephone and Telegraph Co., for 1935 shows total operating revenues of $2,457,753, as compared with $1,557,319 in 1934. After expenses, maintenance, depreciation, taxes, interest, etc., there was a net loss of $525,509, as compared with net loss of $1,112,141 in 1934.

The balance sheet as of December 31 shows current assets of $754,537, including cash of $302,348 and materials and supplies of $396,179. Current liabilities totaled $247,330. Total assets were $32,159,720.

Sosthenes Behn, president, stated in the report that the improvement in operations in 1935 over 1934 was the result of a net gain of 6,365 telephones during the year. At the end of 1935 the company was serving 33,943 telephones, as against 31,578 at the end of 1934.

Business of the Radio Corporation of Cuba increased substantially during the year both in outgoing and incoming messages. Mr. Behn said that business in general was stimulated as a result of the reciprocal commercial treaty with the United States and through the Jones-Cositgan act.

Would Bar Telephone Company From Furnishing Race Results

Suit to restrain the Bell Telephone Company of Pennsylvania from furnishing telephonic or telegraphic information on horse racing to the General News Bureau, an Illinois corporation, has been filed in common pleas court in Philadelphia.

The action, brought by James P. McVeigh, Bell Telephone Company stockholder, also named the Nation-Wide News Service, Inc., as a defendant.

The court was asked to cancel and annul all existing contracts between the telephone company and the news agencies where it may be proved that races or other sporting events through telephone or telegraph facilities for the alleged use of betting.

General News Bureau, McVeigh contended, was organized under the laws of Illinois for the alleged purpose of gathering horse-racing information and selling it to professional operators.

Similar allegations were made in the charges against the Nation-Wide News Service, Inc., a Delaware corporation.

A. T. & T. Income In March Rises

American Telephone & Telegraph Co. reported net operating income for March and the first three monfhs of 1936, sharply ahead of the like periods of 1935.

March net operating income totaled $2,124,929, the highest in four years. This compares with a net operating income, in the same month last year, of $1,388,400.

Net operating income soared to $5,661,375 in the first three months this year from $3,857,353 in the comparable period last year. Gross income for the period increased $3,374,139 over the first three months of 1935 to a total of $26,375,665.

I. T. & T. Votes Capital Cut

Stockholders of International Telephone & Telegraph Co. meeting on May 13, voted to reduce the amount of capital represented by each share of stock from $33.33⅓ to $20. Six million shares are affected.

It was explained this action provides against "any contingency that might arise and makes possible a resumption of dividends."

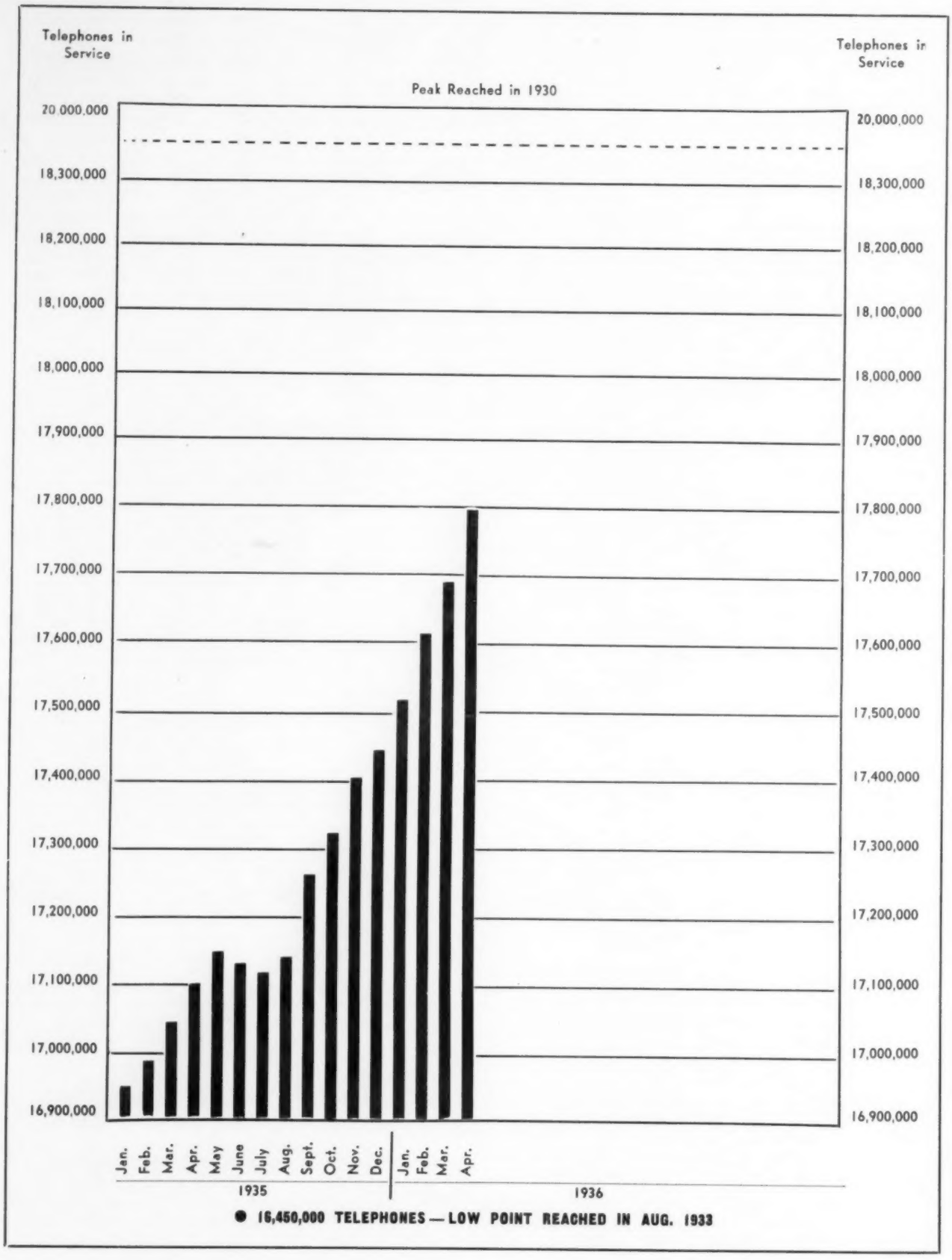
Sees Auto Telephones

A day when Americans will be able to converse with their homes from moving automobiles and trains is foreseen by David Sarnoff, president of the Radio Corp. of America.

Tasmania-Australia Cable

Tasmania, large island of the state of Australia, 180 miles south of the mainland, was connected by telephone with the rest of the world March 25 for the first time through the inauguration of a submarine telephone cable to Australia.

Monthly Telephone Station Barometer



High Taxes Flayed at Ohio Convention

● The subject of taxes received a great portion of the attention of speakers and listeners at the 43rd annual convention of the Ohio Independent Telephone Association at Columbus, April 22 and 23.

The following retiring directors were reelected: Henry George, Ashland; Frank Binkley, Bellefontaine; J. Warren Safford, Troy; J. E. Albert, Columbus, and J. F. Smith, Cadiz.

The directors elected the following officers: President, Col. Gustav Hirsch Columbus; Vice-President, Tom Carliss, Marion; secretary-treasurer, Frank L. McKinney, Columbus.

Taxes were termed the most disturbing problem facing the telephone industry in the annual reports of President W. C. Henry, Bellevue and Secretary Frank L. McKinney at the opening session of the convention. These two reports followed the address of welcome by Mayor M. B. Gessaman of Columbus and the response by J. Warren Safford of Troy.

● Following the reports by the president and secretary, F. B. MacKinnon, president of the United States Independent Telephone Association, addressed the convention on "Telephone Problems of 1936," drawing attention to the activities of federal commissions in their regulation of the telephone industry.

One of the most interesting addresses of the meeting was that on "The Future of America Under the Social Security Act and Unemployment Insurance," by G. B. Chandler, secretary, Ohio Chamber of Commerce. He declared that government interference in these matters will not help us out of the depression but will delay our emergence from it.

Following Mr. Chandler's address, Col. Gustav Hirsch made a report of the work of the committee appointed last year to formulate a uniform toll agreement for association member companies.

"State Regulation of Telephone Companies" was the title of an address by Frank C. Dunbar, Columbus attorney.

● Charles Mylander, vice-president, Huntington National Bank, Columbus, gave an interesting talk on "Profitless Prosperity."

Frank Binkley, Bellefontaine, discussed "County Wide Local Service vs County Toll Service."

Following informal discussions on such subjects as "The Buyers Market Approaches an End"; "Three Minutes With the Representatives of Our Associate Members" and of problems facing companies the convention was adjourned.

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The light weight handset is easy to hold. It fits the hand.

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The subscriber never repeats or has to raise the voice. The outgoing booster transmission is loud and a perfect reproduction of the voice.

These things are quickly appreciated by your subscribers. Just try a set or two and get the reaction.

Leich handset telephones are giving perfect satisfaction in many exchanges. They will give equally good results in yours.

Our Catalog No. 165 describes the money saving features of the 2 in 1 handset telephone.

LEICH ELECTRIC COMPANY
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TELEPHONE APPARATUS BACKED BY 28 YEARS' SERVICE

Iowa Convention Attracts Big Attendance

● Iowa telephone men turned out en masse for the 41st annual convention of the Iowa Independent Telephone Association, April 7, 8 and 9 in Des Moines, the attendance setting a record for the past several years.

The following five retiring directors of the association were reelected: G. E. Atkinson, secretary-general manager, Creston Mutual Telephone Co., Creston; Earle D. Bellamy, general manager, Bellamy Telephone Co., Knoxville; J. H. Denkhoff, general manager, Iowa Telephone & Telegraph Co., Dyersville; Lester D. Meyers, president, Boyer Valley Telephone Co., Woodbine; and L. F. Morrison, manager, Iowa Continental Telephone Co., Washington.

The directors reelected the following officers: President, C. A. Farrington, president, Appanoose County Telephone Co., Centerville; vice-president, J. M. Plaister, general manager, Fort Dodge Telephone Co., Fort Dodge; vice-president, G. E. Atkinson, Creston; and secretary-treasurer, C. C. Deering, Des Moines.

● The convention was called to order by President Farrington, and he called upon Secretary C. C. Deering for his annual report in which he stressed the work carried on by the association the past year.

President Farrington then gave his annual report, emphasizing that increases in telephone stations and improvements in public relations were continuing and predicted a bright future for the industry.

Through the courtesy of the Whitall Tatum Co., New York City, a film entitled, "Glass Insulators," was shown. The film traced the development and manufacture of insulators.

The first day's session was adjourned following the showing of two films, "Far Reaching Speech" and "Sea-Going Telephones." The films were presented by the Northwestern Bell Telephone Co.

● The second day's meeting was opened by a discussion on taxes by Joe Long, executive secretary, Iowa Taxpayers' Association, Des Moines.

President F. B. MacKinnon, United States Independent Telephone Association, was unable to attend the convention and was represented by Louis Pitcher, Dixon, Ill. Mr. Pitcher traced the activities of the National Association in regard to its work with federal government regulatory bodies.

"The Social Security Act" was the subject discussed by Truman S. Stevens, former chief justice, Iowa Supreme Court.

● H. F. McCulla, Lincoln, Neb., presented the features of the "Community Building Plan," which his company, Lincoln Telephone & Telegraph Co., follows in increasing the value of the telephone to its community.

John W. Wopat, well-known consulting engineers of Ft. Wayne, Ind., gave an interesting and instructive address on "Inductive Interference Due to Long, Single-Phase Power Taps."

"Our Industry's Tax Problems" was the subject of a stirring discussion by Frank L. McKinney, secretary-treasurer, Ohio Independent Telephone Association.

● Prof. Frank D. Payne, engineering department head, Iowa State College, discussed the subject, "The Iowa State Planning Board—Its Report on Telephones and REA."

The third day of the convention was given over to an open forum on such subjects as the rural electrification program, collections, advertising, Social Security Act, etc.

Indiana Convention Best in History

It was the consensus of opinion among Indiana telephone men that the 17th annual convention of the Indiana Telephone Association on April 29 and 30 at Indianapolis, was the best convention ever held by that organization.

The program was one of the most interesting and instructive ever planned and the attendance, including manufacturers representatives and supply men totaled 350.

The conferences which were held prior to the opening of the convention, which covered traffic, accounting, plant and commercial subjects were exceptionally well attended. In addition to those subjects, problems of individual companies were introduced thus adding to the interest of the meetings.

The opening of the convention followed a luncheon at which there were 175 men and women from all sections of the state. The after luncheon speaker, Kathryn Turney Garten, reviewed the life of Theodore N. Vail.

In an address entitled "Praised Be The Telephone", Frank E. Bohn, Fort Wayne, president of the association, pictured the magnitude and importance of the industry in the every day social and economic life of every community. He pointed out that while the population of the United States had increased 65 per cent since 1900 there had been an 800 per cent increase in telephone calls. In this same period letters have increased only 200 per cent and telegrams 70 per cent. He attributed the success of the business and its attractiveness as a means of livlihood to the fact that it is a business dedicated to service and that the service has been so personalized that each person engaged in the business is proud to have a part in making the slogans "the message must go through" and "the voice with a smile wins" realities.

Sales personified was the keynote of the playlet entitled "Every Day Uses of the Telephone". Bernice Van Sickle of Indianapolis who wrote and staged the play pictured a farm home typical of numerous rural residences having all modern conveniences of life except telephone service.

In his talk entitled "Why Should I Keep Books" Harry Boggs of Indianapolis pointed out that "the telephone business is a highly individualized factor in our modern civilization. The commodity it offers is quite different from that of the average merchant because you cannot tie a string around a package of service. Its product flows direct from producer to consumer. There are no middle men profits. —Your patrons need the service and are usually willing to pay a reasonable price for it, but they are entitled to know that such price is based on true costs. The law requires that you shall keep proper records to show these costs just as it requires that you furnish proper service."

Ona Engle and Iliss Staples, both telephone people from Greensburg, entertained and furnished accompaniment for the singing with splendid music on accordian and guitar. The after dinner speaker was Charles Milton Newcomb of Delaware, Ohio, a philosopher of national reputation.

On Thursday Sergeant Frank W. Morrow, chief communication officer of the Indiana State Police, was introduced and held the most strict attention of his audience as he talked on "The Apprehension of Criminals by Radio and Telephone".

F. B. MacKinnon, president, National Independent Telephone Association, cleared up many mental questions in his talk on the national problems which affect the telephone business.

Edward J. Greene, McCready Pension Engineers, Indianapolis, spoke on the operation, administration and duties of the tax payer in connection with the Social Security Act.

Directors elected for a three-year term were: J. F. Carroll, Indianapolis; John Harbaugh, Sullivan; J. G. H. Klingler, Brazil; V. W. Robinson, Winchester and W. J. Uhl, Logansport.

All officers re-elected were President, Frank E. Bohn, Fort Wayne; first vice-president, R. V. Achatz, Aurora; second vice-president, J. G. H. Klingler, Brazil; secretary-treasurer and general manager, W. H. Beck, Indianapolis.

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● There's no proving ground for insulators like actual service right up on the poles where nature can hammer away at them winter and summer with cold, heat, rain, frost, wind and snow. That's where Hemingray Insulators have proved they are unaffected by seasonal or sudden temperature changes. They are homogeneous in character with only one coefficient of expansion. Write us about your requirements. Owens-Illinois Glass Company, Structural Materials Division, Muncie, Ind.

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One ANCHOR for all soils

HARD • MEDIUM • SANDY • SWAMPY • UNDER WATER

- **LOW INSTALLATION COST**
- **INSTALLED AT ANY ANGLE**
- **LESS WEIGHT PER ANCHOR**
- **NO EXPENSIVE TOOLS**
- **NO HOLES TO DIG**
- **NO FILLING OR TAMPING**

MASTERGRIP TWO WAY, Type E2, offers you strength beyond ordinary field requirements at lower installation cost. Mastergrip E2, with Medium blade shown, will withstand a strain of 23,495 pounds. The total area is 29.97 sq. in. holding a strain of 784 pounds per sq. in. The secret of this amazing strength is that Mastergrip E2 has a head diameter of only 2⅛ in. and 79.1% of its expanded area holds against firm, undisturbed soil.

Mastergrip E2 weighs only 6¾ pounds with the Medium blade shown. It is easy to handle, is installed quickly at any angle, in any soil or under water. A hammer and steel tube are the only tools needed.

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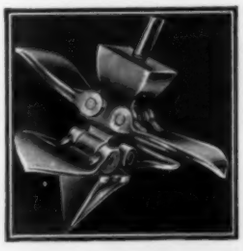

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From the careful inspection of the alloy tool steel made to the most exacting specifications—

Through the old craftsman methods of individual manufacturing and individual heat treating—

To the final steps of rigid inspection and testing, each pair of pliers that carries the Klein trademark represents the maximum in plier quality.

Klein methods viewed in the light of modern mass production are necessarily more costly.

On the other hand, for a man who demands a plier of Klein quality there is no way to produce it except the Klein way.

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3200 BELMONT AVENUE, CHICAGO, ILL.

Radio Telephoning In Hawaii

(Continued from page 19)

cisco. In 1914 the American Marconi Co., cooperating with Western Union at continental points, established a radio station in Honolulu and began handling traffic. During the war the company was taken over by the navy and after Radio Corporation of America was founded at the instigation of President Woodrow Wilson the R. C. A. took over the Honolulu station, which it has continued to operate.

Within recent years communication development in the island has been rapid. The Commercial Pacific Cable Co. continues to operate the cable while Mackay Radio & Telegraph Co., Globe Wireless, Ltd., Press Wireless, Inc., and R. C. A. handle radio traffic. Radiophone service from any point in Hawaii to continental United States, Europe and England is available at all times. Army and navy units maintained their own stations. Scores of amateur shortwave stations are operated. Broadcast entertainment programs are received and sent without any difficulty, giving the island exactly the same chain programs that are heard elsewhere in America. News photographs have been sent and received via radio by Honolulu newspapers, permitting publication in Hawaii of photographs of events in New York or Washington the same day they occurred.

Line and Desk: Questions and Answers

(Continued from page 20)

the rear of our power panel gets dusty and when a thorough cleaning is attempted, generally after blowing two or three fuses we give up in disgust and just go on living in dirt. Any suggestions you can give which may tend to make this cleaning a bit easier will be greatly appreciated.

A. Dust is ever a deadly enemy of delicate telephone equipment and in our opinion its accumulation should never be permitted on or in any piece of telephone equipment. Cleanliness may not be next to Godliness but is most assuredly necessary in the telephone business. In the old days it was thought that a feather duster was the only possible means of removing dust from equipment and on my first job I wore out one on an average each month. In the modern age vacuum cleaners have been used to some extent around the exchange though we do not believe they are adequate for all dust removing purposes. There are always confined places where hand methods must be resorted to. We make use of a good paint brush for this purpose. A good paint brush does not mean the 10-cent store variety but one of pure grey Russian bristles or their equivalent, vulcanized in rubber and bound with a good grade of fibre. The metal bound variety of paint brush is considered worthless for cleaning around the telephone exchange as it is likely to damage equipment due to short-circuits. The brush described can be effectively used for cleaning the wiring in the rear of the power switchboard. Round painters' dusters of good quality may also be used to good advantage around the telephone exchange.

Q. In the repair of switchboard cords is it considered satisfactory to solder metal terminals to the tinsel of the conductors?

A. This will depend entirely upon the type of cord used. In the old days it was almost impossible to solder a terminal to the tinsel conductor as the heat would burn and make it brittle, causing frequent breaks. This old conductor could be easily pierced for a screw and when repaired would be as serviceable as new. Some of the modern cords are much better than the old ones from a service standpoint but are not easily repaired in this manner as the tinsel is fine and spreads easily if pierced for a screw. Before piercing the end of the tinsel should be well bound with thread. Strange as it may seem this fine tinsel may be easily and effectively soldered to a metal terminal.

Wisconsin Bell Tax Bill Sets New Mark

The Wisconsin Telephone Co., which is engaged in a contest with the state utility commission over a cut of nearly $1,000,000 a year in service rates, paid into the state treasury May 2 the largest sum on record under the state income tax. The payment was $1,605,515, and covered the income tax assessed against the company for the years 1929-1935, and also the tax on non-operating income for the years 1923-1931.

The receipt of the check closed a six year contest over taxes. Brought under the state income tax law in 1929, the company had contended that it could not separate its interstate income from its intrastate income and that the levy of the state tax was a violation of its constitutional rights.

Dispatching Trains

Telephone train dispatching is being used by a greater percentage of the mileage of Class I railroads in the United States than ever before, the telegraph and telephone section of the Association of American Railroads reports. Use of the telephone for dispatching trains has steadily increased during the past fifteen years.

It's a Humdinger!
Vacuum Grip's NEW Improved TYPE BOLT CUTTER

THE MOST powerful cutting tool ever built. A true overcapacity cutter that does the work of conventional type cutters measuring from one-quarter to one-third larger.

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Built on the compound lever principle—multiplies power. Strong handles of special malleable steel. A rugged all-service cutter that also cuts the tool budget.

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14"—Cutting Capacity 5/16"
18"—Cutting Capacity 3/8"
24"—Cutting Capacity 1/2"
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BLADE ASSEMBLIES
Side-Cut Type
Center-Cut Type
Diagonal-Cut Type
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BUILT UP TO A STANDARD NOT DOWN TO A PRICE

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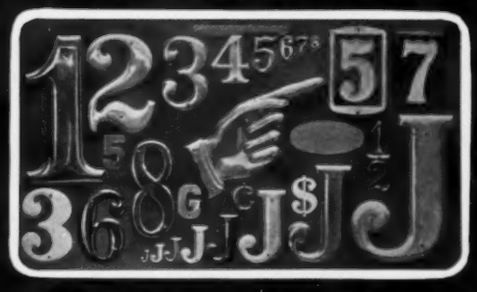

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TELEPHONE SECURITIES

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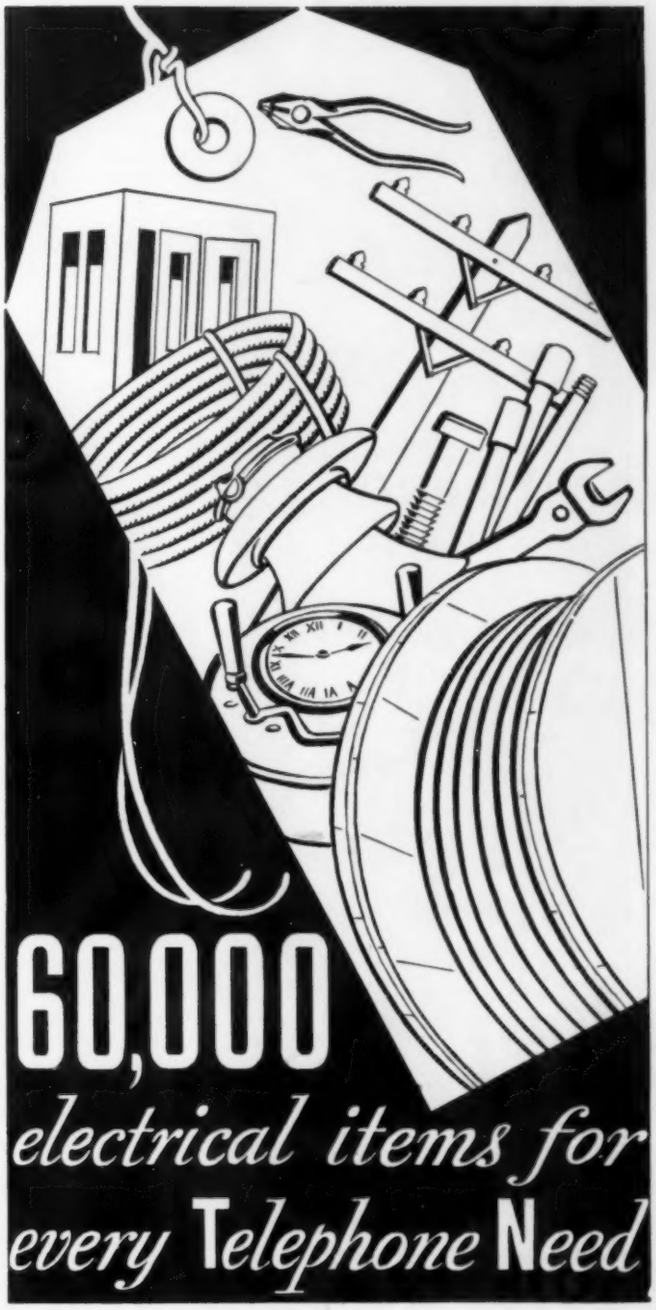

60,000 *electrical items for every Telephone Need*

In these days when everyone is looking for purchasing economies, Graybar's service of supplies makes economies possible . . . It brings 60,000 electrical items within arm's reach of the telephone user. Does away with "shopping" around. Eliminates expensive stocks ... The natural result of Graybar's long experience in meeting the special needs of the telephone industry—an experience that goes back to the beginnings of that industry in America. **GraybaR**

OFFICES IN 78 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BLDG., N.Y.

More Hours of Service

. . . that's what every telephone engineer seeks . . . *more hours of service* . . . which means fewer replacements, lower service costs! And that's exactly what Ray-O-Vac telephone batteries offer!

For 3 decades Ray-O-Vac batteries have met and exceeded specifications and requirements on every recognized telephone and light intermittent test, and surpass all government standards. For lower service costs, specify Ray-O-Vac!

RAY-O-VAC COMPANY
Formerly FRENCH BATTERY COMPANY
MAIN OFFICES AND PLANT
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Clinton, Massachusetts and Lancaster, Ohio

Handset Charge Reduced By Illinois Commission

The Illinois Commerce Commission on May 1 entered an order reducing the extra charge made by the Illinois Bell Telephone Co. for cradle type telephone sets from 25 cents to 15 cents a month. The new rate became effective May 11.

The commission ruled also that the period after installation during which the charge may be made should be two years instead of three. A year ago the commission set a limit of three years of continuous service for addition of the extra charge for the special equipment. Prior to that time the charge was continued indefinitely.

General Telephone Corp. Quarter Net Up

General Telephone Corp. and subsidiaries for the quarter ended March 31, report net income of $313,797 compared with net of $236,622 in the like quarter of the preceding year. After allowance of $55,135 for preferred dividends a balance of $258,622 was shown available for common stock for the 1936 period, while in the 1935 period no preferred dividends were paid. Operating revenues increased to $2,869,431 from $2,670,590.

For the twelve months ended March 21, 1936, net income of $1,063,125 was reported, and a balance of $897,720 was shown after allowance for preferred dividend requirements.

Earnings for the twelve months were after $202,670 expense of holding companies, including $106,808 of expense of the predecessor Associated Telephone Utilities Company but exclusive of certain expenses incident to the reorganization.

Annual provisions and the reserves for depreciation recorded in the companies' books do not purport to represent the amount of depreciation sustained during the period or accrued to date, the company states.

Reports for the various subsidiary operating companies of the General Telephone Corp., show a substantial gain in stations. The reports follow:

Indiana Associated

Indiana Associated Telephone Corp., Lafayette, Ind., reports a gain of 390 stations for April, making a gain of 1,043 for the first four months of this year, or 2.96%; this compares with a gain of 171 for April, 1935, and 643 for the first four months of 1935.

Associated, Ltd.

Associated Telephone Co., Ltd., Long Beach, Calif., had a gain of 440 stations in April, making a gain of 2,017 for the first four months of this year, or over 2½%; this compares with a gain of 161 for April, 1935, and 962 for the first four months in 1935.

Michigan Associated

Michigan Associated Telephone Co., Muskegon, Mich., showed a gain of 1,227 stations for April, making a gain of 2,116 for the first four months of this year, or 6.89%; this compares with a gain of 857 for April, 1935, and 1,454 for the first four months of 1935.

Ohio Associated

Ohio Associated Telephone Co., Marion, O., reports a gain of 232 stations for April, making a gain of 732 for the first four months of this year, or 3.7%; comparing with a gain of 146 for April, 1935, and 342 for the first four months of 1935.

Newspaper Lauds Union Telephone Co. of Owosso

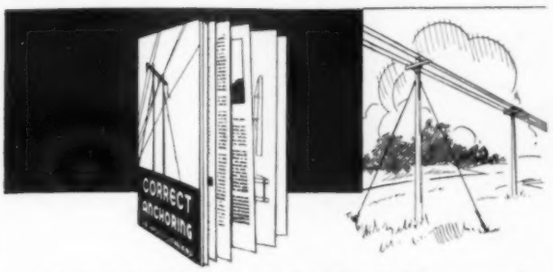
One of the best examples of public relations building information given to the public about a telephone company coming to our attention was the recent article in the Saginaw (Mich) *Labor News* describing the Union Telephone Co., Owosso, Mich. The article follows:

"There need be no truth in the old adage that 'Out of sight is out of mind.' Not with the Union Telephone Company on the job and ready to provide you with the very best in telephone service at surprisingly low rates. This progressive company has for many years faithfully fulfilled the needs of this district in this respect. If it continues to operate on its present and past fine policy and continues to receive the support of the working people, we can see no reason why it will not continue to serve Owosso citizens for many years to come.

"The excellent policy under which this reliable company has always operated, is one of the very best, which includes prompt and courteous service at all times and rates that place this modern convenience easily within the reach of every wage-earner. Through the efforts of the Union Telephone Co., the telephone has become practically a household necessity.

"Many people fail to avail themselves of the low rates on long distance calls. Such calls can do so much to keep in close touch with members of the family or dear friends from whom we must be separated. We urge you to give the Union Telephone Company your heartiest patronage and cooperation for they certainly do deserve it by reason of first class service and a constant effort to do the best for the public."

A BOOK YOU NEED



"CORRECT ANCHORING" and "FIGURING STRAINS on GUYS"

Here's a new **FREE** edition of "Correct Anchoring" which includes "Figuring Strains on Guys," and other valuable information that you will need in your line construction and maintenance this summer.

Write for FREE copy.

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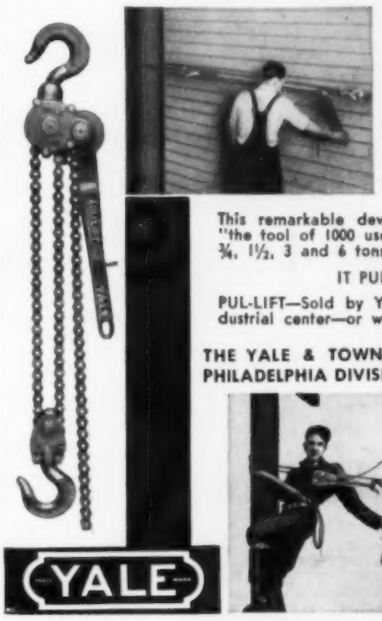
WORLD'S LARGEST ANCHOR MANUFACTURERS

The "PIGMY" HOIST WITH A GIANT'S POWER

A real Telephone Company Service Tool . . . the



PUL-LIFT

The PUL-LIFT is small and light enough to easily be carried about by one man, yet its power and durability are amazing—and it is a real glutton for work. It both pulls and lifts—operates either in horizontal or vertical position.

This remarkable device is appropriately called "the tool of 1000 uses." It is made in 4 sizes—¾, 1½, 3 and 6 tons capacities.

IT PULLS—IT LIFTS

PUL-LIFT—Sold by Yale distributors in every industrial center—or write direct to us for details.

THE YALE & TOWNE MANUFACTURING CO.
PHILADELPHIA DIVISION — PHILADELPHIA, PA.

YALE

Phillips Cords are definitely better

In the new PHILLIPS telephone cord, the outer covering is composed of a material never before used for the purpose. This wiry fabric produces a tougher, longer-wearing braid than anything heretofore experienced—one that adds literally months and years of wear to the useful life of the cord!

Besides this, still further improvement has been effected by laying the conductors flat instead of twisting them together in the usual way—a construction which virtually eliminates kinking. Insulation resistance also has been materially increased by means of a specially-developed process of impregnation.

Here at last in the PHILLIPS cord, is a better cord for every telephone use—one that you are urged to try at your earliest convenience. To order, merely specify number of conductors, length of trim desired. Prices gladly quoted upon request.

PHILLIPS PRODUCTS INCLUDE: Bare and Insulated Copper Wires—Rubber Insulated Wires—Enameled Wires—Magnet Wire—Power Cables—Switchboard Cables—Paper Insulated Cables—Flexible Cords—Electrolytic Copper Rods, Shapes, etc.

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No air nor moisture can seep into a Nicopress Joint—
Joints Easily and Quickly made either in Air or on Ground—
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Nicopress Tool is convenient, rugged, durable and practical—
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A true posture chair designed to increase efficiency, mental alertness, reduce fatigue, improve the health and comfort of the operator.

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You will find complete description and flat prices on fifty different kinds of re-manufacturing jobs in our Suttle Salesman Catalog No. 40 which was sent you recently. Each of these jobs shows you a way to save money by salvaging your old used equipment.

These Are Guaranteed Jobs

COMPLETE MAGNETO WALL COMPACTS, Made up from parts you send in, 10 lots, ... **$7.75**

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TRANSMITTERS, Complete Job, including nickel or black enamel finish, 50 lots, ... **43c**

RECEIVERS, You send defective core only and get complete receiver and cord like new, 25 lots, ... **92c**

HANDSET MAGNETO WALL TELEPHONES, You furnish generator, ringer, coil—we include new Leich handset, return complete phone, 5 lots, ... **$13.45**

MAGNETO INDUCTION COILS, Rewinding, 5 lots, ... **33c**

See Suttle Catalog 40 for Details

Suttle Equipment Co.

LAWRENCEVILLE, ILLINOIS

Managing Editor Lauds Telephone Service

T. J. Masterson, managing editor of "The Iron Mountain (Mich.) *News*", pays a distinct compliment to long distance telephone service and the personnel of the telephone company organization, in the following letter, addressed to the Iron Mountain manager, W. F. Clarke:

"As you are aware, newspapers are heavily dependent upon the facilities of your company in their daily work and would be severely handicapped were they not available.

"An instance arose today in point, when I had occasion to place several long distance calls. I had little hope all could be completed, yet each was most important. So I must express the appreciation of 'The News' and myself over the fact that each call was put through after considerable effort on the part of the operators.

"There have been similar occasions in the past and sometimes I wonder how the operators do it. But in any event, it has been the experience of 'The News' that it has consistently received the finest cooperation from your personnel and I think that you should know it. Sometimes we users of the telephone become very impatient, but we don't know the half of it."

Service Reasonable in Cost, Says Engineer

Fred M. Odena, Jr., consulting engineer in Detroit, finds that telephone service is excellent, and that its cost is reasonable, according to a letter of commendation he recently sent to the telephone company. He writes, in part:

" . . . for the last ten years, since I have lived at my present home, my telephone service has never been interrupted for a single moment, and I feel that I can be assured that in case of trouble I can be in touch with the Fire or Police department in a few seconds. Therefore, I think that your engineers are to be congratulated for the fine equipment they have devised to give such a great service to this community . . . I do not think that the cost of such a service is too high."

Serves King's Ranch

The recently-organized Kingston Mutual Telephone Co., operated by a group of southern Alberta (Can.) ranchers, boasts a royal subscriber. He is King Edward the Eighth, whose "EP" ranch is on the line connected with the outside world through facilities of the exchange situated at High River, Alberta.

Southwestern Reduces Handset Charge

A reduction in rates for hand-set or French type telephones has been announced by the Southwestern Bell Telephone Co.

Under the new rate schedule, the 15-cents-a-month charge will be abolished May 26 for all hand-set telephones that have been in service for two years or more.

The rate cut will become effective throughout the Southwestern Bell system in Texas, Oklahoma, Arkansas, Missouri and Kansas.

Telephone System for Locks and Dams Studied

Looking forward to completion of its Mississippi river locks and dams, the Rock Island, Ill., district of United States engineers is mapping out a private system of communication to link all units of the system when the dams are completed.

Radio telephone is being studied, as is also a direct telephone hook-up. Preliminary conferences on the matter are being held with representatives of the Illinois Bell Telephone Co.

Information on river stages and maintenance of pool levels is one of the important uses for which the co-ordinated system would be utilized.

The break at the base of the cofferdam at dam No. 11, Dubuque, will delay work about three weeks, engineers estimated. It was noted when the contractors began to unwater the cofferdam after the recent flood stage of the river.

Eastern Indiana Bond Issue

An issue of $200,000 Eastern Indiana Telephone Co. first mortgage and collateral trust four per cent., due 1956, bonds has been placed privately by Webber-Simpson & Co. The company operates 5,262 telephone stations in Winchester, Ind., and vicinity.

Proceeds of the issue will be used to redeem $217,000 first mortgage and collateral trust five and one-half per cent bonds which have been called for payment, June 1.

Telephone Bond and Share

Telephone Bond and Share for 1935 shows net income of $87,696, compared with $42,138 in 1934. The balance of subsidiaries' earnings applicable to securities held by Telephone Bond and Share for 1935 was $1,089,789, of which the parent company received $994,096 in dividends and interest.

Petroleum Electrical Association Meets

The Petroleum Industry Electrical Association held its annual meeting April 9, 10 and 11 in Tulsa, Okla., with headquarters at the Mayo Hotel. Over 100 members registered during the sessions.

The following officers were elected for the ensuing year: F. P. O'Connor, Stanolind Pipe Line Co., Tulsa, president; P. F. Davis, Texas Pipe Line Co. of Oklahoma, Tulsa, Vice-President; H. E. Browne, Sinclair Prairie Pipe Line Co., Independence, Kans., secretary-treasurer.

During the meeting the following papers were delivered: "Safe Driving," by G. O. Lockwood, Empire Oil Co., Bartlesville; "Pipe Line Electrolysis," by V. J. Siddell, Stanolind Pipe Line Co., Tulsa; "An Informal Discussion on Telephones," by Paul Reeves, Southwestern Bell Telephone Co.; "Direct Currents," by C. E. Foster, Oklahoma Pipe Line Co.; "Induction Interference," by E. B. Jennings, Southwestern Bell Telephone Co.; "Dust Storm Static," by W. T. Bulla, American National Pipe Line Co., Chicago; "Telephone Transmission," by L. E. Adler, Magnolia Pipe Line Co., Dallas; "Use of Alternating Current at Pipe Line Pump Stations," by W. S. Dyer, Ajax Pipe Line Co., and an illustrated talk on "Automatic Tank Guages," by Mr. Hammer of the Sinclair Prairie Pipe Line Co., Tulsa.

The following members of the Association attended the convention.

G. M. Smith, United Gas Co., Houston; R. M. Bayless, Humble Pipe Line Co., Houston; Grover Reed, The Lone Star Gas Co., Bowie, Tex.; D. W. Sims, The Continental Pipe Line Co., Ponca City, Okla.; P. F. Davis, The Texas Pipe Line Co., Tulsa; J. W. Flint, Empire Companies, Bartlesville, Okla.; Morris Chambers, Standard Pipe Line Co., Inc., Shreveport; H. C. Miller, The Pure Oil Co., Chicago; D. R. Welch, The Sinclair-Prairie Pipe Line Co., Independence, Kans.; H. E. Browne, The Sinclair-Prairie Pipe Line Co., Independence, Kans.; L. T. Gibbs, The Phillips Petroleum Co., Bartlesville, Okla.; F. P. O'Connor, The Stanolind Pipe Line Co., Tulsa; H. B. Allen, The Arkansas Natural Gas Co., Shreveport; and J. F. Collerain, The Houston Pipe Line Co., Houston.

The following members were absent but had representatives at the meeting: F. S. Leonard, The Shell Pipe Line Corp., St. Louis; A. J. Balcom, The Magnolia Pipe Line Co., Dallas; T. J. McMahon, The Texas Pipe Line Co.

J. M. Plaister, Independent Pioneer, Passes Away

Joseph Morrill Plaister, secretary and treasurer of the Fort Dodge Telephone Co., Fort Dodge, Ia., and vice-president of the Iowa Independent Telephone Association, passed away on May 1, after a short illness due to a sinus infection and heart trouble.

Mr. Plaister was born in Dubuque, Ia., on March 17, 1878, and was educated in the grade and high schools of that town. He became associated with the Marshall Telephone Co., Marshalltown, Ia., in April, 1896, as lineman. Two years later on September 1, he was made manager of the telephone company at Fort Dodge. Since that time, Mr. Plaister for 38 years concentrated on the development of that property.

Mr. Plaister was one of five men who organized the Iowa Independent Telephone Clearing House in 1905, being named its secretary and treasurer. He was always very active in furthering activities of and interest in the Iowa Independent Telephone Association and served as its president in 1910. More recently he served as vice-president and was reelected to office at the recent Iowa convention, although unable to attend on account of illness.

Mr. Plaister was a member of the United States Independent Telephone Association and of the Independent Pioneer Telephone Association of the United States.

Operating Costs of Light Duty Trucks

Companies that use fleets in which trucks of a rated capacity of one and one-half tons or less predominate will find many points of interest in "Operating Costs of Light Duty Trucks," a report recently issued by the Policyholders Service Bureau, Metropolitan Life Insurance Co. The information lends itself readily to comparison with one's own records because, so far as possible, statistics given are qualified by descriptions of circumstances in each case; further, tables included give operating statistics of fleets for which identical accounting methods are used.

There are 24 detailed operating cost tables in the report. With but one exception, they are comprised of original recent material taken direct from operating records of companies that co-operated in the survey upon which the report is based. Various breakdowns are represented by these tables: by truck capacity, by length of route, by total mileage, by states, by geographical regions and cities. The co-operating companies operate in manufacturing, retailing and public utility fields.

This new report by quoting and analyzing actual records in the light duty truck classification adds measurably to available information. Any reader who wishes to study the details of this report may obtain a copy by writing to the Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison Avenue, New York, N. Y.

Telephone Engineer

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(See our space in next month's issue)

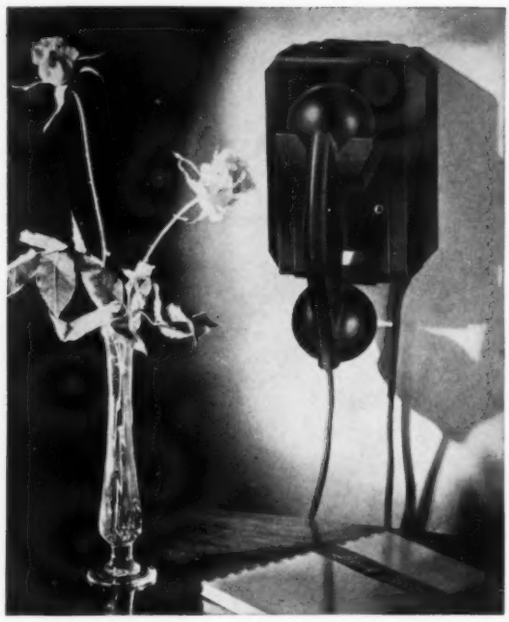
Two More New Masterphones By Kellogg Shown

In the accompanying illustrations are pictured two of the new "900" line of bakelite Masterphones—Nos. 9900 and 9917—and the new 700 bakelite desk set box, recently announced by the Kellogg Switchboard and Supply Co.

In announcing these new Masterphones the Kellogg company points out that the instruments are small and of pleasing design with ample ringing and ease of handling. All of the new telephones are equipped with the Triad circuit and non-positional transmitters.

The small and compact design of the new Masterphones, the company states, required smaller sized parts that would provide the proper efficiency. Thus the first step was the engineering of a wholly new type of ringer, induction coil and a new condenser.

The ringer in these Masterphones and the 700 desk set box has an overall measurement of less than 3x4 inches. It is less than 1″ in height. While the tone is not harsh and noisy, the sound is intensified and made to travel by the help of a wholly new resonance chamber. Resonance chambers are something new to telephony but they have been used in phonograph reproduction and in other cases where the intensifying of sound is a factor, it is said.



New No. 990 Kellogg Masterphone.

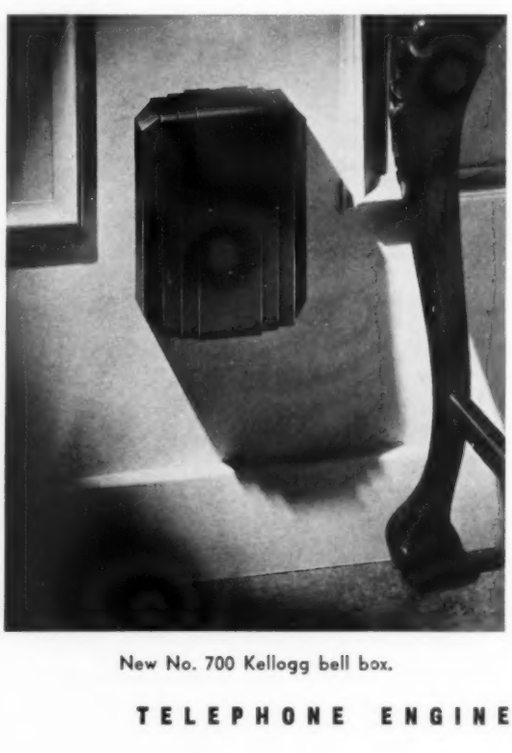
The new small induction coil is of the closed core type with silicon steel laminations giving a well-balanced coil. This is the heart of the Triad circuit and makes for clearness and naturalness of conversation.

The new small condensers are of the paper and foil type having 1½ M. F. winding for the ringer circuit and 1 M.F. winding for the receiver circuit.

All of the new small parts in these Kellogg Masterphones and the 700 box, except the condenser, are interchangeable with those of the new manual and dial combination desk Masterphones of the "900" series, it is claimed. In the 9917 dial wall Masterphone, like the 9900, the entire bakelite cover can be removed by simply releasing the positive locking catch at the bottom. This exposes the entire interior and gives easy access to any part. All of the parts are mounted on the steel backplate. Only three screws are required to mount the entire instrument on the wall.

The 700 box can be combined with the 710 Masterphones.

New No. 9917 Kellogg Masterphone.



New No. 700 Kellogg bell box.

Automatic Introduces New Jumper Wire

A new type of jumper wire, claimed to have a remarkably high insulation resistance, even under conditions of excessive humidity, has been developed by Automatic Electric Co. research engineers, and is now being offered to telephone companies under the trade name "Monotype".

The higher insulation resistance of the new wire is due chiefly to the development of an improved type of insulating material and the perfection of an exclusive process of applying it, it is claimed. Exhaustive tests at average conditions of room temperature and humidity have been conducted in the laboratories of Automatic Electric Co. in determining the relative qualities of Monotype jumper wire.

Tests have also been made under artificially severe conditions of temperature and humidity. Similar tests were made with the samples "kinked". Results of all tests showed an unusually high performance as to insulation resistance of the new wire, it is said.

The makers of Monotype jumper wire have also made exhaustive tests as to its flame resisting qualities and state that these tests showed the same relative performances as in the other tests in regard to flame resistant qualities. Other features listed for the new wire include a much smaller overall diameter, permanence of color of insulation, and absolute protection from corrosion.

Monotype jumper wire is available in single conductor, twisted pair and triplex No. 22 gauge, with either tinned or tinned-enamelled copper conductors.

Cites Baltimore Case In Setting Aside Louisiana Rates

District Judge, W. C. Jones, has set aside an approximate $9,000,000 annual reduction in telephone rates established in Louisiana a year ago under direction of the late Senator Huey P. Long.

James O'Conner, member of the Louisiana Public Service Commission that established the lower rates on March 21, 1935, said an appeal would be taken.

Judge Jones based his decision on the valuation methods for company property used by the commission. He cited a recent case in Baltimore, in which the U. S. Supreme Court held that physical appraisal of all company properties must be made. The Louisiana commission fixed telephone company valuations by taking price indices for properties in the state alone.

There are fifty-eight telephones in the White House.

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GALVANIZED PRODUCTS

Line Gangs Know from Actual Experience

MEN in the field recognize the outstanding advantages of *Crapo* Galvanized Telephone Wire and Steel Strand. They know from experience that these dependable products can be spliced without injury to the heavy, *pure* zinc galvanized coating; that they are easily and quickly served; that they last longer in actual service under all conditions. For long life and low maintenance costs, specify genuine *Crapo* Galvanized Wire and Strand on all new and replacement jobs! Their superiority in actual service is a matter of record in the engineering offices of some of America's leading public service companies.

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Muncie, Indiana

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Steel Strand

YEARS AHEAD
OF ALL OTHER
RINGING MACHINES

30 DAYS FREE TRIAL

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- NOTHING TO ADJUST
- NO RADIO INTERFERENCE
- PRICE $45.00

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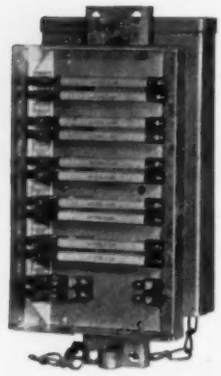
COOK

SX PROTECTED TERMINAL 4-5-6 PAIRS



The best and most economical way to carry your open lead circuits at railroads, highways and bridge crossings is with underground cable. Cook SX provides an excellent means of terminating, protecting and testing this cable.

The SX is ideal for cable distribution where only a limited number of drops will be required.

Of typical Cook quality, this terminal costs considerable less per pair than larger size protected terminals.

OUT-DOOR PROTECTED COIL MOUNTING

Made to mount one or two repeater or phantom coils, and providing protection and terminal facilities. With the exception of phosphor bronze fuse springs, all metal parts are of steel, hot galvanized.

Protection consists of A-7 fuses and True Gap Dischargers. No coil is furnished, but two pairs of protection is provided for single coil mounting, five pairs for two coil mountings.

A very strong, neat, weatherproof and fireproof housing, that is very reasonably priced.

COOK ELECTRIC CO.

2700 SOUTHPORT AVE.

CHICAGO

Form Consulting Accounting and Engineering Firm

The partnership of John C. Larkin and Co., Chamber of Commerce Building, Syracuse, N. Y., has been formed and will conduct a consulting accounting and engineering practice and offers its services to telephone companies.

John C. Larkin

The firm will specialize in accounting, auditing, financial investigations, rate surveys, governmental reports, and inventory and appraisal of physical property; engineering in connection with construction, operation and maintenance of physical property, particularly in respect to rehabilitation of plants and change over from manual to automatic operation, also toll routing, and transmission studies. The firm has a well trained staff of accountants and engineers and proposes a plan to supervise the general and plant accounting.

Accounting, auditing, and financial activities of the partnership will be directed by John C. Larkin. For more than 10 years, Mr. Larkin has been engaged as principal or supervising agent in an accounting and auditing business in Syracuse specializing in utility problems. He numbers among his clients many Independent telephone companies. During these years Mr. Larkin has been actively engaged in handling financial and management problems of utilities as well as accounting and auditing.

Engineering activities will be under the direction of Emmett D. Talbot, well known to many of the telephone utilities in the United States and abroad, having been associated with larger telephone operating companies for more than 30 years. Mr. Talbot was formerly general superintendent of plant for the Federal Telephone and Telegraph Co. of Buffalo, leaving there in 1916 to take a position on the engineering staff of Bell Telephone Laboratories for a period of 11 years, specializing in machine switching studies having to do with construction, installation, and maintenance of more important machine switching systems. In 1926 Mr. Talbot became associated with International Telephone and Telegraph Corp., as plant engineer, where he was responsible for the standardization of all types of central office equipment, plant materials, and methods of construction for use of the associated operating companies. Mr. Talbot's work placed him in close contact with problems of the various operating companies, and he spent a large part of his time in the foreign field in Cuba, England, Mexico, France, Belgium, Siam, China, and Japan. In 1931 Mr. Talbot went to Porto Rico as chief engineer of the Porto Rico Telephone Co. in direct charge of engineering and operation of the company's system in Porto Rico. Mr. Talbot became associated with Mr. Larkin in 1936 as a partner in the firm of John C. Larkin and Co.

Emmett D. Talbot

Howard V. Swartz, senior member of the firm of Swartz & Haight, certified public accountants, has been identified with the public accounting profession in New York as staff member and principal since 1923. Mr. Swartz will devote the major portion of his time to firm activities as an accounting consultant.

Other members of the firm are J. Felix Cholet and Arthur L. Nicholson. Both are experienced telephone accountants and have been associated with Mr. Larkin for more than 10 years.

Automatic Equipment for U. S. Barracks

● Announcement has been made by G. B. Foscue, chairman of the board, American Automatic Electric Sales Co. of the installation of a 900-line Strowger automatic telephone exchange at U. S. Marine Barracks, Quantico, Va. The equipment was engineered and manufactured by Automatic Electric Co.

A unique specification requirement of this installation is that in addition to supplying switching equipment for full-automatic central-office service, including trunk connections to both public and private long distance lines, several "special service" facilities are provided, including discriminating (restricted) trunk service, fire reporting service with calling line identification, executive direct-line service, and progressive conference call service.

Switching equipment is of the Strowger line-finder type. A total of 900 line and cutoff relays, 70 finder switches, 70 selector switches, three special second selector switches, two reverting call switches and 70 connector switches are included. Conventional traffic meters provide for registration of traffic peg counts, all-trunks-busy conditions, and overflow calls.

● Provision is made for full-selective, divided-ringing-two-party line service on a terminal-per-line basis, telephone ringers being connected to either side of the line and ground. Ringing current of approximately 19-cycle frequency is supplied from a rotary type ringing generator.

Each group of connector switches serve two 100-line groups. This is accomplished by equipping each connector with 200-point line banks. Telephone numbers consist of four digits. The first digit selects the connector group in which the desired line is located; the second digit selects the proper 100-line unit of the connector group, and also determines the side of the line (+ or −) over which the ringing current is sent; and the last two digits select the desired line in the particular hundred group. Reverting calls on party lines are made by dialing the two-digit code "19."

Two groups of long distance lines are associated with the automatic exchange, known as "commercial," leading to the public-exchange network and the second group, known as "Navy," leading direct to Navy headquarters at Washington, D. C. Connections to end from these lines are completed through a one-position toll switchboard located in the automatic switchroom.

● Outgoing service from the Quantico automatic exchange to these long dis-

(Please turn to page 44)

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tance lines are handled on a discriminating, or restricted, basis. Three hundred of the local lines are automatically restricted to local service. A second group of local lines (200 in number) are permitted connections to the commercial long distance lines, and obtain a trunk to the toll switchboard by dialing "9." A third group of local lines (400 in number) obtain connections to the commercial lines by dialing "9" and to the Navy line by dialing "8."

The power plant includes a power board, a 46-volt storage battery, charging equipment and ringing machines. Charging equipment consists of a 12-ampere rectifier designed to care for normal traffic loads, and a 25-ampere motor-generator set for use during the periods of peak traffic.

Two rotary type ringing machines are provided, one a 45-watt machine operating from the commercial power circuit; and the other a 30-watt machine designed to operate on direct-current supplied by the storage battery. Both machines generate ringing current of approximately 19-cycle frequency, and failure of the 45-watt A. C. machine automatically switches in the 30-watt machine operating from the storage battery.

● Two special trunk circuits to fire headquarters provide means for reporting fires, access to either trunk being obtained by dialing "70." This causes the associated repeater to place ringing current on the trunk for operating the alarm signal at fire headquarters. Concurrently, a special line-finder switch in the automatic exchange seeks the calling line in an auxiliary group of special line relays, preparatory to sending in the number of the calling line to fire headquarters. When the calling line has been found, the associated number is automatically transmitted over the trunk to fire headquarters where it is punched on a tape register. Release of the call is under the control of fire headquarters. When a fire call has been received, the alarm may be extended to a group of 15 pre-assigned lines for the purpose of dispatching firemen. Operating a key at fire headquarters will cause apparatus in the automatic exchange to ring the 15 lines simultaneously. As each fireman answers the call, an associated

(Please turn to page 45)

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Klein No. 1625 Improved Haven's Clamp for Messenger Strand.$3.25
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Western Elec. No.20 C. B. Ind. Coils @ 35c ea. No. 46 @	.55
Kellogg No. 79 C. B. Ind. Coils @	.45
Western Elec. No. 20AL desk stand with W. E. Trans. & Rec. complete with 3 Cond. Cord @	5.25
Chicago Telephone Supply 4-bar 1000-1600 or 2500 ohm ringer compacts @	5.35
Chicago Telo. Supply 5-bar 1000 1600 or 2500 ohm ringer compacts @	6.90
Western Elec. No. 143 Receiver with New shell cord @	1.15
Kellogg No. 41 Receiver with New shell & cord @	1.25
Western Elec. No. 143 3 spring short lever switch hooks @	.75
Kellogg No. 15 3-bar Brass bearing generators complete with crank & screws @	1.85
New Kellogg C. B. or Magneto Grabaphones complete with 3 Cond. Cord less signal sets @	7.25
Western Elec. Cordless Visual signal C. B. PBX board with 7 local lines and 3 trunks complete with desk set Opr. set @	100.00
Chicago Telo. Supply Local Battery Ind. coil 3 connection type @	.35

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supervisory lamp at headquarters indicates the answering line.

One telephone station is equipped with an executive key cabinet for direct service to a total of 25 pre-assigned lines without requiring the dialing of the line numbers. The cabinet contains 25 keys, one key for each assigned line. To connect with any line, the particular key in the cabinet is operated which causes the bell of the associated line to ring continuously until answered. A low-toned buzzer in the cabinet sounds as an indication that the line is being signalled. When the called line answers, the handset of the Monophone at the calling station is lifted from the cradle to complete the connection. If the desired line is busy when the key is operated, the ringing is delayed until the line is freed from the previous connections.

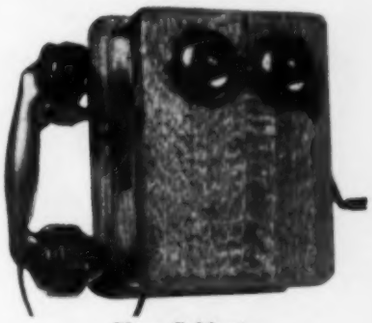
● One telephone station is equipped for calling progressively any number of lines in a pre-assigned group of 20 lines or less, and connect them to a common talking circuit for conference purposes. A conference may be established by dialing two-digit codes associated with the desired lines in the group. As each person answers, he is instructed to wait on the line, and the conference may commence as soon as the last person answers. No telephones other than those called can enter the conference, but additional stations may be called in during the conference, and conferees may withdraw at will. The conference call apparatus in the automatic exchange is released when the Monophone handset at the calling station is returned to the cradle.

Gould Moves Offices of Eastern Branch

The Gould Storage Battery Corp., has moved its eastern sales office and service depot from 796 10th Ave., to 549-551 West 52nd St., New York City. E.R. Jacobsen, eastern sales manager is in charge of all sales and service activities along the Atlantic Seaboard, including the New England States. E. C. Laffey, sales engineer of the New York Office, specializes in industrial motive power applications.

Telephone Equipment
(Continued)

MAGNETO HAND SET TELEPHONES



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